HANDCRAFTS OF THE SOCIETY ISLANDS

BY

WILLOWDEAN CHATTERSON HANDY

BERNICE P. BISHOP MUSEUM

BULLETIN 42

HONOLULU, HAWAII
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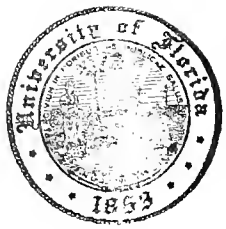
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Handcrafts of the Society Islands

By Willowdean Chatterson Handy

INTRODUCTION

There may have been a time when the handcrafts of the eight inhabited islands now known comprehensively as the Society Islands could have been treated as individual variations of a parent stock; but today the practice of their crafts with certain minor exceptions—appears to have been identical in all the islands of the group. A mat made on Maupiti, for example, is recognized on Tahiti as the genuine old native mat; but, no longer being made on Tahiti, the technique of its making cannot be definitely compared. The islands of Tahiti, Moorea, Raiatea, Huahine, Borabora, and Maupiti were all ransacked for evidences, past or present, of the practice of the native methods of plaiting and cord and net making. And yet so rarely are any of these household arts pursued today that the word of the old people, most of whom are unskilled in these arts, is the only authority that the technique now followed in one or two isolated places is representative of the whole body of the ancient practice. The assumption is that what is performed today here and there is the heritage of the people of the entire group, save in certain instances where districts are admitted to have "specialties," which may or may not point to an ancient divergence of methods pursued by the different "clans" of the old social order.

Only on small, isolated Maupiti, households may still be said to carry on the native arts and crafts as part of the daily routine, and even here the practice of tapa making has disappeared even from the memory of the half-dozen old people living there, and the arts of plaiting mats and baskets, of cord and net making are undertaken only to supply the scant and random needs of the fifty or so inhabitants. The art of plaiting leaves and stems has flowered in modern times over all the islands in the making of very fine hat braids of a constantly increasing variety of patterns and colors. Every woman makes her own hats, and they are multiple, as well as those of her lover or husband. She always has a braid on hand, which she picks up and adds to when she sits smoking on her veranda in the daytime and when she draws close to the lamp on the floor in the evening. Since hats of such form were first made here in 1820, when according to Ellis,[1] Mrs. Williams and Mrs. Threlkeld started the fashion

[1] Ellis, William, Polynesian researches, 2nd ed., vol. 2, p. 400, London, 1831.

among the natives of Raiatea, a study of the technique of so modern an industry can only indirectly contribute to our knowledge of veritable native crafts. It can bear witness to a remarkable aptitude for manipulating elements with the fingers and possibly to original methods carried over from some earlier use of plaiting. For this reason, a brief survey of this new art is here given, with a presentation of the principal types of braiding. Furthermore, since it has been suggested by a reliable Tahitian authority that some of the varied materials used today in the plaiting of hat braids were formerly used in decorative plaits on house-posts, it has seemed worth while to record processes of their preparation, some of which are elaborate. With a knowledge, for example, of the present methods of preparing and plaiting the glossy white bamboo or the manioc and the blue skin of the *fei* (*fe'i*) (species of banana) trunk or the black skin of the midrib of the oaha fern (*Asplenium nidus*), it may be possible to visualize more intelligently such a description as Ellis gives:[2]

> The lower extremities [of the rafters of a house] were ornamented with finely-woven, variegated matting or curiously braided cord, stained with brilliant red or black and yellow native colours, ingeniously wound round the polished wood, exhibiting a singularly neat and chequered appearance . . . . terminated in a graceful fringe or bunch of tassels.

The fringes of olden time house decoration have survived in costumes for dancing.

The traditional technique of ordinary, old-fashioned plait work and net work, however, is found rarely outside Maupiti. All native Tahitian houses are equipped with floor mats of hala leaf (lauhala), but the most of these are woven in Rurutu and bought in the Chinese shops of Papeete. A sad shake of the head was the only answer I ever got to my inquiry for one who could make a genuine native mat, until I reached Maupiti. There is not a man, woman or child in all the islands who cannot fling together a checkerwork cooking sheath or carrying basket of coconut leaves, and many houses seem to be equipped with that more substantial coconut leaf basket of twilled work called the *ara iri,* but I know of only two old women outside Maupiti who can make the *ara iri.*

Fish traps of twined work are the specialty of five isolated districts on the island of Tahiti—Faaone, Hitiaa, Mahaena, Tiarei, and Papenoo—and here the technique of their manufacture may occasionally be observed. Sandals are still manufactured in Temae on Moorea as well as on Maupiti, where Teraitua showed me also a genuine woven form.

Cigar-shaped bundles of plaited coconut fiber cords are for sale in the Chinese stores, but this sennit is made in out-of-the-way islands. Only

[2] Op. cit., vol. 2, pp. 358-9.

on Maupiti could I find a man to demonstrate the process of preparing the fibers and plaiting and twisting them into the two types of cord. Heavy ropes of the outer and the inner bark of the purau tree (*Hibiscus tiliaceus*) are twisted and plaited everywhere, however, when the need for such a convenience arises. A few old men know that the inner barks of the *roa* and the *piripiri* were used for fish lines and nets, but it is possible now to obtain only descriptions of the process of manufacture. While fishermen may be seen in all parts of the islands mending nets, most of the nets are of foreign manufacture. However, it is possible to learn to tie the mesh here and there—using American made twine—but only on Maupiti did I find a definite knowledge and use of two types of net tying. Curiously enough, the selling of oranges in the markets of Papeete has led to the only preservation of the net once used for carrying or hanging bowls or gourds. In the districts where the boys go up into the hills for oranges for this village trade, it is often possible to observe them making containers of purau bark, copying in rough and simple way, the old *toto,* or carrying net.

From such fugitive glimpses of old industries this account of the handcrafts of the Society Islands has been compiled.

PLAITWORK

PREPARATION AND USES OF MATERIALS

Hat braids and rough emergency baskets of coconut leaves are the only obvious evidences of plaiting in the islands today. A casual observer will perhaps notice a coil of tan lauhala or of glossy white bamboo or a pile of straw-like reeds by the side of a hat maker, but these materials are usually overlooked in the fascination of following the intricacies of the plaiting. Such coils and bundles may be bought in the Chinese stores, and are consequently taken for granted. It is surprising to find a field for investigation in the preparation of materials for plaitwork in these islands. It is soon discovered that certain districts are famous for certain processes; they alone know the secret of, for instance, the elaborate preparation of the bamboo or the *manioke;* and at certain times of year they become workshops for the manufacture of the rolls and bundles of material sold in the stores. The introduction of millinery has kept alive, even stimulated to remarkable degree, an industry which draws its workers from every household. Once on the trail of such activities, the investigator now and then happens upon the less obvious processes of preparation of less showy materials, which seem to far antedate the making of hat braids. The list of plants and parts of plants prepared for one purpose or another grows unexpectedly. The leaves and bark of trees, the skins and fibers of reed stems, even rootlets are being continually collected and subjected to processes of soaking, drying, scraping, and bleaching to fit them for working into objects ranging from sturdy fish traps to the most delicate and festive headgear.

Coconut Leaves

Of all the leaves used in plaitwork, none is so constantly pressed into service as that of the rough and ready coconut. Ordinarily requiring no preparation whatever beyond the cutting of the great midrib into convenient lengths, with even the leaflets laid by Nature along the rib, when the leaf is folded, in sinistral and dextral layers, fastened, ready for the hand of the plaiter, it is small wonder that baskets and mats of this material are made for the moment's need and thrown away the next. The only refinement of this crude material for plaiting precedes the manufacture of the substantial *ara iri* basket. A selection of leaves is made for this process, young ones only being cut; and they are treated by being

dragged slowly across a blazing fire. The flames scorch and toughen the leaflets until they appear glossy and like leather. Sometimes the edges of the leaflets are stripped away (*pahai*) by running the thumb nail swiftly through them from butt to tip. It is probable that a similar refinement of this material preceded the ancient manufacture of coconut leaf fans and sunshades. Today, finer materials enter into the manufacture of these articles and only a few of the old objects may be observed in museums. In the manufacture of many of the *ara iri* baskets, as well as of others, a portion of the heavy midrib is pared away to make the article less clumsy. Mats for roof thatch are laid on the ground for several days to weather before being raised to their position on the roof. But apart from these simple measures, coconut leaves undergo no preparation other than the hacking from the tree and cutting into the desired lengths for immediate use.

The coconut tree is called *haari;* the great leaf, *niau;* the great midrib, also a section of it, *tie;* a half a *tie, iaau;* the butt of the stem, *fa;* a leaflet, *rauere;* and its small midrib, *niau.*

Lauhala

The long, ribbon-like leaves of the hala tree (*Pandanus sp.*) are next in importance to coconut leaves in point of usefulness at present; but in the days of mat making, they must have been of even greater value. These leaves (lauhala) are more durable and lend themselves to finer and more permanent manufacture than the coconut leaves. The natives distinguish three varieties of the *Pandanus,* according to the way in which the outer tissue of the leaves peels. If the tissue comes off in long strips, the tree is an *iri;* if the skin breaks into short strips, the tree is a *fara.* On the other hand, *paeore* is easily distinguished from the other two trees, the leaves having edges with few or no spines and these only at the base of the leaves. The leaf of the *fara,* which is used for thatch, and leaves of the *iri,* used for cigarette paper and occasionally for hat braids, are similar in appearance, both having thorns along the midrib and edges. For plaiting into mats, satchels, hats, fans, and formerly sails, leaves of the *paeore* are used.

Paeore Leaves

Members of a family may be seen visiting a paeore tree early some morning. They cut off a pile of the long, shining leaves at their butts. If there are spines (*tara*) to be removed, there is always a shell with a sharp edge in the old woman's tobacco basket for the paring; and the smooth leaves are soon ready to be laid side by side on the beach to dry.

In Papara on Tahiti there is an old woman who dries her *paeore* in the following way: For four sunny days, the leaves are placed on the beach and are borne into the house every nightfall. On the fifth morning, the old woman makes coils of the leaves, rolling each with its dorsal side inside and tying them thus, so that during the next two days, as they dry more slowly in the house, the edges become flat. On the seventh morning she shakes out the coils, ties the leaves in pairs at the tips and hangs them over a line for another out-of-door drying. When they have had four days more of sunning, she considers them ready for use and may, if the need is pressing, strip them immediately into narrow strands for plaiting, or, as is more likely, roll them again into large coils, called *pipitai,* for future use.

On Maupiti, the drying is more thorough, perhaps, two weeks or more being considered essential for the process. There being no spines on the variety of *Pandanus* grown on this island, the shell is used only when the leaf is dry to cut off (*hitoi*) the thickness of the midrib on the under side (*pae ino*) of the leaf. When first coiled for drying, each leaf is rolled singly with this under side out into a small coil known as a *poai.* The dried leaves, handled three at a time, are rolled from butt to tip, the butts of each triplet being inserted under the tips of the preceding one until the coil grows to unwieldy dimension, when it is tied through the center with a strip of a leaf.

Purau Bark

Today, the use of *more,* as the inner bark of the purau tree is called, is practically restricted to the twisting or plaiting of ropes for lashings or stays on canoes or the tethering of pigs, the occasional plaiting of sandals which fishermen in out of the way districts sometimes wear on the reefs, the tying of nets for carrying oranges, the twisting of fine cords when needed in the fabrication of dance costumes and the making of the fringes known as "grass skirts." In older times, however, *more* occupied an important place in plaiting of mats both for clothing and for warm coverings.

In the Museum of the Société d'Études Oceaniennes in Papeete is an old *more* skirt once worn on the island of Borabora. This is the only visible proof of the old style left in the islands; and there is none of the house mats said to have been made of *more* in the old days. Ellis [3] describes the preparation of *more* as follows:

[3] Op. cit., vol. 1, p. 186.

Many of the people, especially the raateiras, or secondary chiefs, wore a kind of mat made with the bark of the hibiscus, which they call purau; and the preparation of this, as well as the beds or sleeping mats, occupied much of the time of the females. Great attention was paid to the manufacture of these fine mats. They chose for this purpose the young shoots of the plant, and having peeled off the bark, and immersed it in water, placed it on a board, the outer rind being scraped off with a smooth shell. The strips of bark were an inch or an inch and a half wide, and about four feet long, and when spread out and dry, looked like so many white ribands.

The treatment of the inner bark for use as adornment for dancers probably remains in the main as it was when the upper classes were to be clothed in fine, white mats. March, April, and May are still the months when the young shoots of the purau tree are cut for the making of *more*. These slender sticks are laid in quiet, muddy water for eight days. Swift-flowing river water not accomplishing the necessary soaking, a water hole is dug for this purpose. After the soaking, the outer bark is stripped off and a thorough washing and cleaning is administered to the sticks until they are white and silky. Hard beating with a stick breaks up the purau stick and softens and shreds these white fibers until they are ready for combing. There were probably always workmen who combed the fibers with their fingers to the desired fineness; but in former times, many, at least, accomplished the result with a comb (*pahere*) constructed for the purpose. It was a double comb of fine strips of bamboo lashed firmly with coconut fiber across a central strip, so that the teeth projected on both sides. Today, these are replaced by combs of European manufacture and only descriptions may be obtained of the old *pahere*. When the *more* fibers have been combed into fine and silky filaments, they are put away in bundles for whatever need may present itself.

Bamboo Stalks

The stalk of the bamboo (*ofe*) yields both the coarsest and the finest materials for plaitwork; the coarse, as might be expected, requiring small preparation, the fine, subjected to a most elaborate process of drying, scraping, and bleaching. Stalks an inch or more in diameter are used in their crude form for plaiting large checkerwork mats for house floors and walls. Cut in the desired lengths, the stalks are leaned against a tree to dry until the green skin has faded to almost tan. They are then split lengthwise and left to open naturally until each stalk is spread to a flat strip. These elements for the coarse checkerwork mat are made more pliable by a partial shredding. A length is laid upon a log and struck with a bush knife in four or five places, so that it partially splits into lengthwise strips held together by woody fibers. This completes the preparation for the plaiting.

The preparation of the bamboo for hat braids, fine baskets, fans, dance costumes, and probably in ancient times for mats to cover house posts, is a very different process. For a long time, every attempt to investigate the process which transformed the hard green stalks into the rolls of white, satiny, paper-thin material sold in the stores ended in blank disappointment. In the helpful way of natives in such matters, they allowed me to inquire endlessly and search futilely for the performance of this process, without telling me that it is a "specialty" belonging to but three districts on Tahiti and that it is performed only at a certain season of the year. For months, it appeared to be a dead art; then suddenly, upon a visit to Marau Taaroa at her country place near Papeete, I happened upon the actual process. A woman, introduced to me as "a friend from Tiarei, who always makes Marau's bamboo for her," was sitting on the earth floor of the back porch in the shade of the thatch, surrounded by great canoe-shaped wooden troughs and half covered with piles of white curly shavings of bamboo. Inside the house, spread upon the bed were the rolls of white, ribbon-like bamboo I had searched for so long, still damp from her hands. My excitement was matched by my disappointment, for she had been at work for two days! However, from this point forward, I watched the process with hawk-like intensity and inquired into every previous move she had made. A sense of complete accomplishment was of course lacking, but there was gratitude that the last practitioner of the art had been found!

About a week later, I visited the isolated districts of Tiarei, Mahaena, and Hitiaa on the inaccessible side of Tahiti, and lo! here, there, everywhere bamboo was being prepared! In one yard, it lay on the ground in the rough, cut in lengths of four or five joints; in another, it was propped against the house in the shade, split and slowly opening; in another, it was soaking in great wooden troughs (*umete*); in another, it was being scraped. And the sudden prevalence of the industry was so simply explained. Here alone, in these districts of the old clan of Te Aha Roa is the process known or performed, probably because here alone grows the variety of bamboo fit for the work; and at this time alone may the bamboo be cut for the purpose.

In January, the large bamboo begins to grow, and through March, April, and May the stalks are of sufficient size to be cut. Although as many as seven layers of skin may be taken from a length of this large variety, it is not generally used, the quality of the finished product not being fine enough to suit the taste of expert workers. The high grade material must be waited for until May, June, and July; for it is

taken from the shoots (*papua*) which spring up beside the great bamboo just after their maturity.

So, in the month of June, the industry is booming in the districts of Tiarei, Hitiaa, and Mahaena. Men and boys bring down great bundles of the young *papua,* having cut off and thrown away three or four of the top joints. The careful fingers of skilled workers examine the lengths brought in to determine how many joints may be used for the best grade of material—three or four at the most. The butt joints are discarded, possibly as many as four. When the early material is used in March, April, or May, as many as ten joints, numbering from the butt, are thrown away. The carefully selected middle sections of the papua shoots, handled very gently lest the inner skin be scratched or scraped, are then laid in the shade, to season for four days. On the fifth morning, the cleaning process begins. A length of bamboo from joint to joint is called a *pona.* Starting at the top of the pole, the bamboo is cut into its *pona,* each cut being made below a joint, so that each length is open at the top and closed at the bottom. There are always innumerable small hands in the family waiting to carry these *pona* carefully and lean them against the house in the shade, open end down, to await being divested of the outer green skin.

From start to finish, this preparation of the *papua* is one only for skillful fingers of delicate touch. The removal of the thin green outer skin without injury to the inner layers tests the most accurate. Today it is done with a penknife; formerly, the clam shell (*ahi*) furnished the sharp edge. After removing the skin, the lower jointure of the *pona* is cut off. The worker then slides her fingers softly round and round the *pona.* When she finds the almost imperceptible ridge, for which she has been searching, she follows its length from top to bottom. Here and here alone, must the stalk be split (*pitore*) lengthwise. The split cylinders are returned to their places in the shade leaning against the house, and are left to open gradually (*mafera*), until they become quite flat. The *papua,* which is about 1½ inches in diameter, opens to form a strip between 4½ and 5 inches wide (Pl. II, *A*).

The process of separating these lengths into the whitish layers of skins which compose them is called *mahora.* The number of layers taken from a joint varies somewhat with different workers. Some say that from the top length or *pona* of the *papua* three good layers may be peeled off; from the second, four; from the third, five: twelve strips from a three-joint section of bamboo. A woman in Hitiaa takes four layers from each length of *pona.* First, she peels the *pona* into two layers. The outer layer she then separates into two layers, which she calls the *paa* (outside

skin) and the *piri paa* (next to the outside skin). The inner layer she next separates into two layers, which she refers to as the *puo* (the heart) and the *piri puo* (next to the heart). A layer is peeled off with fingers, aided nowadays by a knife, and rolled back into a broad coil as it is removed.

It is now that all the wooden troughs in the family are called into use. Into a trough of clear water the layers are laid flat, weighted with stones, and for two days they soak there (*tapuru*), the water being changed each night and morning. All is ready now for the scraping of the layers to an almost paper-like weight. The strips must be scraped on a smooth, wooden board of soft wood which will absorb water readily. In the days of Tahitian culture, a slab of *purau* was the only wood considered possible for the operation. Today, soft white cedar planks are imported for the purpose; and long sharp kitchen knives have replaced the original shell scrapers (Pl. II, *B*).

This preparation of bamboo is the work of women, and it were better at this stage, if they wore the garb of men; for the worker sits astride the end of the board as she spreads the wet strips upon it and scrapes them thin, constantly dipping water from a nearby trough to keep the work—and incidentally herself—thoroughly soaked. Lifting a strip from the trough, she lays it smoothly along the length of the board and scrapes it evenly and firmly, often pushing the scraper away from her. Some workers alternate the direction of scraping, away (*e rau*) and towards them (*pahahu*). The outer side of the layer is scraped from top to bottom, as it grew; the inner side, from bottom to top. The scraping is thorough and long, a great pile of greenish white shavings being taken from each layer. As the worker finishes each layer, she immerses it again in a trough of clear water, where it remains over night.

Next morning, the bleaching process is started, the strips being transferred to a trough filled with water into which lime juice has been squeezed. The solution is of varying strength: some use one lime to a gallon of water; some as many as four to a gallon. For two days, the strips lie flat in this bath. In order to remove the last trace of the greenish tint, a second scraping is necessary, of less depth and of shorter duration.

The remainder of the process must be accomplished with dispatch, for the strips begin to shrivel as they dry. Immediately after the second scraping, a strip must be immersed in lime water, of less strength this time, and sometimes into clear water, and left until it spreads itself flat again. Thereupon it is taken from the bath, laid upon the board and dried by passing the dull edge of a knife from end to end until all the water has been

pressed out and the strip lies there white, shining and pliable (Pl. II, *C*). When quite dry, many strips are rolled together in a large cylinder and put away in the house.

Pia Stalks

The rarest and most coveted of all hat braids is made of the white, lustrous stalk of the native arrow-root (*pia maohi*). In ancient times, I have been told, it outclassed bamboo as the finest material for plaiting and for decorative flowers, and the glamour of its early use—possibly only by chiefly families—still clings to it. Admiring the first hat of pia which I saw, I made the mistake of calling it bamboo. "Pia," corrected its owner with the tonal emphasis an American woman might have placed on "platinum" if I had admired her ring as "silver."

The preparation of the *pia maohi* resembles somewhat that of the bamboo. A length of about 3 feet may be cut from each stalk (*ata pia*), which is ¾ inch in diameter. Such a section must be split lengthwise (*pahai*) and the operation is still performed in the old fashion with a cord. Today a thread is substituted for old-time cord of *more*. The cord is tied around a small stick, which is thrust into the open end of the pia stalk, and pulled downwards, so that the stick is pulled through the bore of the stalk, the cord cutting the wall of the stem from end to end. Of itself, the split cylinder spreads open until it lies flat, whereupon it is laid upon a board for scraping. The pith is first scraped out (*enena te raau*) with the sharp edge of the *uu* or mussel shell, and the strip is turned over for smoothing (*paaro*) on the outer surface. This was formerly accomplished by the use of a clam shell, but today the dull edge of a knife has become the instrument advocated by all workers. When such a strip (*paehaa*), which is from 2 to 4 fingers wide and 3 feet long, has been properly smoothed, it is immersed in a bath of clear water. There is no such long process of soaking as in the preparation of bamboo, the strips being left in the bath only until the process of scraping the remaining strips is completed. The modern worker sometimes puts a bit of blueing in the water to heighten the whiteness of the finished material. When the long white ribbons have been lifted from their bath, they are spread upon a mat and laid in the shade to dry. In due time they are rolled together in a coil called a *potaro* and wrapped in a cloth before being laid away, for the beautiful, shining *pia* has a tendency to yellow upon exposure to the sun.

Aeho Stalks

On the lower slopes of the hills of the Society Islands grow the tall grasses called aeho (*Erianthus floridulus* Gramin), whose reed-like stems,

2 feet to 3 feet long, provide the material most widely used for braiding. During March the people go up above to cut bundles of *aeho* for this purpose, for it has then reached the proper stage of maturity and has not yet been seared by the sun. Still green, it is carefully wrapped in cloth and brought down to the house, so that it will dry slowly in the dark and not turn brown. These cloth-covered bundles are put away in chests or placed under the thatch and carefully protected to obtain a skin color of an even golden tan. I saw the cleaning and smoothing of the *aeho* accomplished with the sharp and dull edges of a knife, but undoubtedly the mussel shell and the clam shell were the original instruments.

When Tunuvahine finds her aeho stems are quite dry and golden, she splits the stalks in halves and spreads them in the sun. Every morning for two or three days she carries them out onto the ground, every evening she gathers them up and puts them away in a bundle in the house. When their condition satisfies her, she brings a board from under the house and places it in the pleasant shade of a spreading tree and sits down with her bundle of split stems to complete their preparation:

> Splitting each half again in halves, she scrapes the stems in quarter segments. Pith down first, she flattens out the segment with the flat of the knife, until she can turn it over and scrape off the pith without danger of cutting into curling edges. It is the outer skin only which is to be used and this can be removed only by fingers long trained in the art. The expert Teunuvahine peels it off so dextrously as to make it appear a very simple matter. Bending the stem sharply an inch or so from the butt end so as to break the skin, she rubs her fingers across the cut until she has pushed the skin back sufficiently to grasp it with her fingers. Then bit by bit, but very steadily, she strips the skin from bottom to top of the long segment.

Such strips of the golden skin of the *aeho* are split again and again into finer strands when used in braiding, but they are always kept in bundles of these quarter sections of stem.

Stalk of the Sugar-Cane Tassel

The stalk of the tassel of the sugar-cane (*Saccharum officinarum*) is called *to*. When made up into braids it cannot be distinguished by the uninitiated from *aeho,* but there is a general feeling among experts that it is only second-class. Its preparation is identical with that of *aeho*.

Midrib of the Oaha Fern

A dark, rich brown material for plaiting into hat braids or imbricating into mats is obtained under proper treatment from the midrib of the oaha fern. The long leaves of this air plant, which attaches itself to the mape trees (*Inocarpus edulis*), are cut and brought home in great bundles.

While the work of cutting the midribs out from their leaves, without injury to the skin, goes forward, an oven is being prepared in the cookhouse. Stones are being heated and spread over an unusually long area so as to accommodate the length of the midribs. When the stones are hot, a few sections of banana trunk are beaten into strips and laid over them to protect the midribs from direct contact. Thus is the oven for *oaha* made, the midribs being laid upon a bed of green fibers and covered with earth. Left for a whole day, they are in such condition when taken out that the loosened skin may be taken from the midribs. This brown, satiny skin is thin and delicate and is used for trimming plaitwork.

Tough Materials

For twined work, used chiefly in the making of fish and shrimp traps and baskets, stiff, tough materials are necessary: bamboo, the young air roots of the ieie (*Freycinetia sp.*), the stems of the aanuhe fern (*Gleichenia dichotoma*), the air rootlets of the coconut tree, and guava stems for binding hoops. The use of these materials is interestingly distributed. Bamboo is so employed on Moorea and on all of the island of Tahiti, save those districts of the old Te Aha Roa clan. The Te Aha Roa districts alone use *ieie* for this purpose. On Borabora and Maupiti, the stems of the aanuhe fern are used for traps; and on Maupiti coconut rootlets were formerly used.

Little or no preparation is necessary before these materials may be manufactured into strong baskets and traps. One variety of trap, the *tavai,* calls for ieie rootlets, which have been split in half lengthwise; but ordinarily, the *ieie* is simply scraped clean between two halves of a split bamboo.

Materials for Trimming

Two natural materials prepared for trimming plaitwork are too delicate to be plaited and are only made up into streamers and flowers to adorn the more substantial manufactures.

The *revareva* is so beautiful, so prized, that the mere mention of its name will bring the light of joy into any native face; and, strangely enough, this gossamerlike skin comes from the coarse leaves of the coconut tree. A man in one of the districts on Tahiti seems to know by instinct when and where to seek the just-unfolding leaves of the proper coconut tree—the *haari oviri,* broadly distinguished by its green-skinned nuts—which is the only one whose leaves will lend themselves to this ethereal use. I have seen him carry home as tenderly as a baby the soft, white,

unfolded leaves of this tree. With deft fingers he separates the leaflets and opens each one with gentle little pats. His task is the delicate one of removing the surface skin tissue in two half-inch wide strips as it comes from either side of the midrib of a leaflet. He begins at the tip to loosen the fiber that runs along the edge of the leaflet. As he separates it from the fleshy part, the thin white skin adheres to it and peels free save where the midrib fastens it along one side. Grasping the tip of the leaflet's midrib and the edge fiber between the thumb and fingers of the left hand, he presses the thin skin between the right thumb and index finger and shoves it rapidly from tip to butt, ripping the skin from both midrib and fiber edge. A white, translucent ribbon floats from his fingers and he sits admiring it as though he had discovered a new and wonderful secret. Imagine the fairylike quality of a plume of dozens of these gossamer streamers mounted on a short section of coconut midrib and stuck in the glossy locks of a Tahitian girl's hair or surmounting a dancer's plaited headdress!

The tender stem of the pumpkin vine, *mautini,* furnishes another dainty material of which flowers and curling tendrils are made for trimming. A 10 or 12 inch section may be cut from each stem of the vine for this purpose. Placed in a coconut leaf basket, which is then plaited shut, a bundle of stems is immersed in the clear water of a water hole and left soaking for four days. The outer green skin of the fragile stems having loosened, it may be slipped off the satiny white inner tubes. It is these tubes which are split into strips for manufacture.

PROCESSES

Basket Making

INTRODUCTION

Made for the moment's need are the majority of plaited baskets in the Society Islands. Though there are forms which serve somewhat permanently, such as the carrying satchels of lauhala and of twilled coconut leaves, still it may be said in general, and only half-figuratively, that baskets grow on coconut trees, are picked when wanted and thrown away immediately after. A strolling party discovers coconuts at the right stage for drinking. They must be carried home. One member climbs aloft to dislodge them, and cuts, while he is about it, their basket from the tree. A great leaf comes crashing down and in a few moments it has been bent and twisted into a *haapee.* If the load is heavy, the leaflets are gathered into a plait and reinforced with strips of the bark of a nearby purau tree and the coconuts are stowed away in an *ufara* (p. 64).

Or perhaps as they climb the valley path, natives come upon an orange tree weighted with ripe fruit. The nearest coconut tree must be visited to supply a *haapee aua ha* or an *oini peho* before they can carry home a satisfying pack. And if some of the fruit is to be sent by stage to village friends, and not eaten on the way, it is a simple matter to plait a segment of coconut leaf around the oranges, so that only a bush knife splitting the midrib may release them for consumption. Sometimes a group of young people will raid a bush of *tiare Tahiti* (*Gardenia tahitiensis*), bringing home its tightly curled buds in a small *aua haro* with a tiny mouth and a convenient handle (*tapea raa*). The needs of the daily cooking oven are constant: sometimes the *oini peho* must be plaited as a container for bananas, sometimes a *pute ia* for fish.

These innumerable pressing needs for baskets have created a hasty and dextrous manipulation of coconut leaves into a dozen or more shapes, each with its special use, name, and method of construction. The general term for basket is *ete*. Baskets may be roughly classified as *haapee, oini,* and *ara iri*. The large containers, *haapee,* for heavy loads such as coconuts, are constructed from a single large section of a coconut leaf midrib with its adhering leaflets on one or both sides. Lighter, smaller baskets, *oini,* with handles for carrying small loads, some without handles for cooking containers, are made of small sections of the midrib split in half, with two, three, or four leaflets adhering to each section. Satchel-shaped baskets, *ara iri,* for more genteel carrying, are built either of two right hand sections of split midrib laid on two left hand sections, or of one right hand section laid on one left hand section. All *oini* are of checkerwork; most *haapee* of checkerwork; *ara iri* of twilled work.

The general term for the plaiting of baskets is *raraa*. The word *haune* is also used today, but it more properly refers to the technique of mat plaiting. A single element is a *fenu,* anciently an *au,* on Maupiti sometimes called a *noai*. A term often used nowadays is *hua,* which, however, when accurately used refers to the width of a *fenu*. It may be a *hua rahi,* a great width or a *hua iti,* a little width. Among the old people, who are still meticulous in their use of the native language, the dextral elements, those running towards the right, are sometimes referred to as the *fenu haere i te atau* (elements going right); while the sinistral elements or those running towards the left are spoken of as *fenu haere i te aui* (elements going left). They sometimes speak of the *fenu i nia* as the upper layer of elements in the plaiting and *fenu i raro* as the lower layer. They use the word *ohiti* (lift, raise) both for the act of raising an element, so that another may pass under it, and for the element so raised; and the word *taume* both for the act of pressing

down an element, so that another may pass over it, and for the element so depressed.

A few general terms for strokes used in the plaiting of baskets are still to be found today; though it is evident that if, as is probable, there was a rich technical vocabulary, it has mostly disappeared. Checkerwork seems to have no specific designation, though, when a bit of it is inserted into a twilled basket, it is referred to as *haune*. This is the word for mat plaiting, where it always refers to the checker stroke. Twilled-threes seem always to be vertical in basket making, but may be horizontal in mat making, each form being given a name in accord with the technique which distinguishes the stroke; *ohiti toru* (three raised) for the vertical variety, *taume toru* (three dropped down) for the horizontal. Similarly twilled-twos that are vertical are *ohiti piti* (two raised) and those that are horizontal are *taume piti* (two dropped down). Both vertical and horizontal twilled-twos are used in basket-making. *Taviri* (to turn) and *firi* (to plait, as in a three-ply cord) are somewhat interchangeably applied to strokes in which elements are twisted around one another or bound into a plait. Such strokes are used for edges, bottom closing and handles. The word *tara* (thorn) designates an edging stroke, characterized by points formed by folding the elements back along themselves.

DIAGONAL CHECKERWORK

Haapee.—The *haapee,* an envelope 25 to 30 inches long and about 15 inches deep, is perhaps the most usual basket form seen in the Society Islands. It appears in two styles: in the *haapee pahai* the split midrib forms the mouth of the basket; in the *haapee aua ha* the whole midrib forms the bottom of the basket. The processes of manufacture of these two are identical until the final stage, which is governed by the choice of where the basket shall open.

The worker cuts a fresh, large coconut leaf and cuts off a central section of midrib (*tie*), to which 18 or 20 leaflets adhere on either side. She spreads the folded leaf on her lap, midrib towards her, and works first upon the upper layer of leaflets, which spray out naturally towards the right (fig. 1, *a*). Leaving the odd numbered leaflets to act as dextral elements in the checkerwork, she converts the even-numbered leaflets into sinistral elements by twisting them across to the left in the following way:

Working from left to right, she presses down the first element with her left hand, raises the second with her right hand, and turns it back across the first element where she holds it in the sinistral direction (fig. 1, *b*). She skips the third

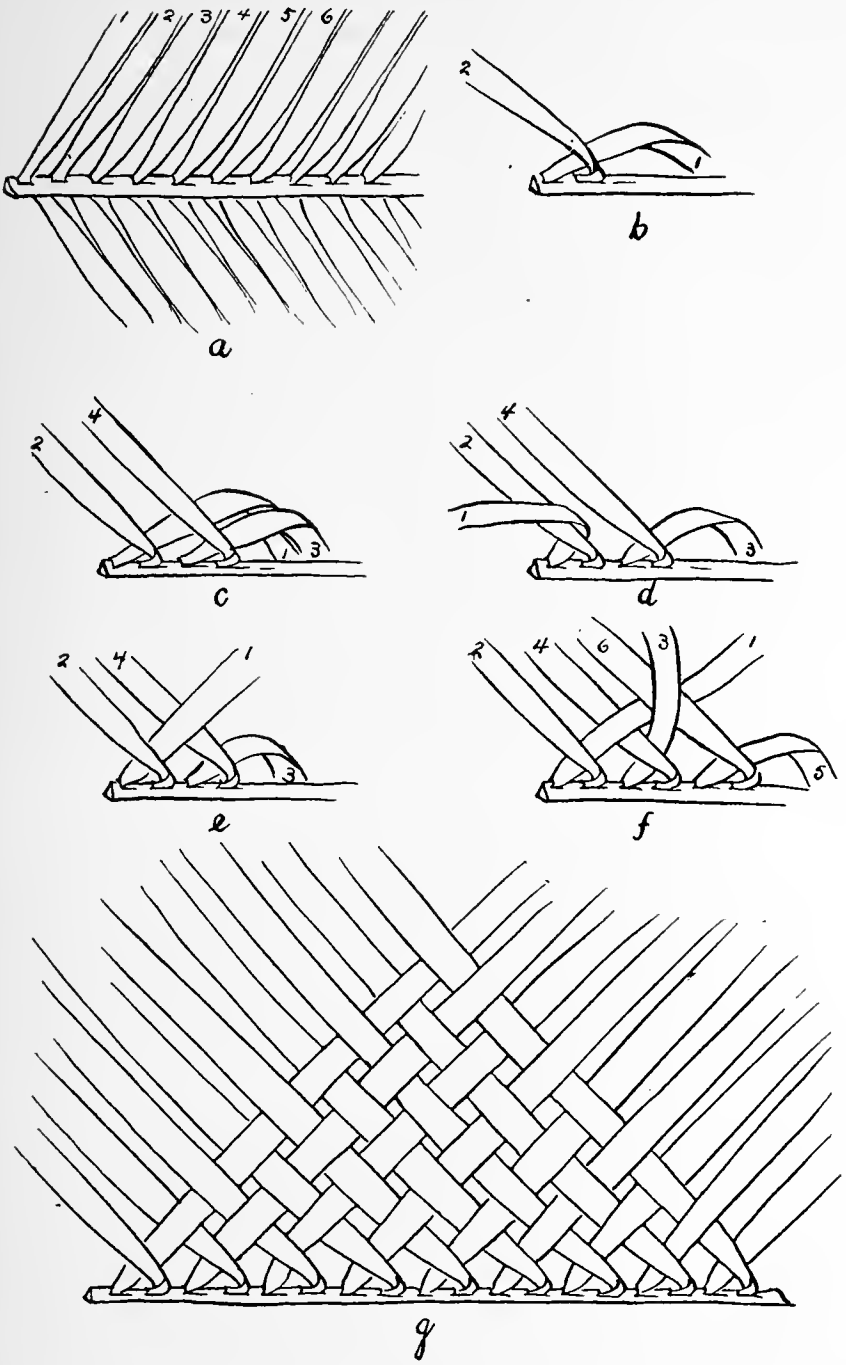


FIGURE 1.—Technique of making *haapee*: *a*, using section 1 of coconut leaf; *b*, convert 2 into sinistral element by twisting it towards left and over 1; *c*, convert 4 into sinistral element; *d*, make first checkerwork stroke, lifting 1 and passing 4 under it; *e*, let 1 fall into place as dextral; *f*, press down 1, lift 3, twist 6 into sinistral alignment, passing it over 5, under 3 and over 1; *g*, make triangular mat of checkerwork on each side of midrib.

element, leaving it for a dextral to be pressed down by her left hand, so that she may lift the fourth and twist it back across the third as a sinistral (fig. 1, *c*). When she has thus crossed two pairs, her left hand returns to lift the first element, so that the right may pass the fourth under it (fig. 1, *d*). From this point, starting with the first and third elements, the worker operates two dextrals at once in her left hand. She skips the fifth element, but with her right hand twists the sixth back over it in sinistral direction. Her left hand raises the third and presses down the first in turn with a quick turn of her wrist, so that the sixth element may pass under the one and over the other (fig. 1, *f*). In such manner she continues the process, her left hand manipulating the dextrals, her right hand passing one sinistral at a time over, under and over three dextrals respectively in a stroke, then four, then five, and so on, until the 18 or 20 leaflets have all been bound into a triangular mat of checkerwork fastened along one side of the midrib (fig. 1, *g*).

Tying the pendant ends of the leaflets in a loose knot to hold the work temporarily, she turns the leaf over in her lap, so that the unworked leaflets on the other side of the midrib lie uppermost. With the midrib towards her again, the natural trend of the leaflets is this time towards the left, so that she must convert every alternate one into a dextral element by twisting it over its right-hand neighbor. This time the worker proceeds from right to left. In her right hand, she gradually gathers up all the sinistrals, alternately raising and pressing them down, so that her left hand may pass a single dextral over and under them in proper order. Her method here approaches weaving, her right hand manipulating what may be called the permanent elements, her left managing a single element moving across them.

The triangular mat of checkerwork completed on this side of the basket also, the worker turns an end of the midrib towards her, and, working from the bottom up, plaits together the dextrals from one side with the sinistrals from the other in the same checker stroke. Having thus closed one end, she turns the work around and closes the other. It is at this stage, when the checkerwork has been completed to a depth of about 15 inches all around, that the worker must choose one of two methods of completing her *haapee*. If she desires a *haapee aua ha,* she gathers the pendant ends of leaflets, two at a time, as soon as a start has been made, into a three-ply plait along the edge of the checkerwork, to form the edge of the basket, and plaits up the final ends into a kind of tail which she sticks into the interstices of the basket and knots inside as a fastening (Pl. III, *A*). On Raiatea, where this form of *haapee* is prevalent, many are reinforced by binding two straight sticks to the plaited mouth, one on either side of the envelope-like basket. In some baskets the thongs of purau bark which tie the sticks to the coconut leaf matting are passed around the basket for further strengthening and looped above as handles.

On the other hand, if the worker desires a *haapee pahai,* she leaves no mouth, but gathers the pendant leaflets from either side into a single three-ply plait, which joins the side mats of checkerwork. She opens such a closed sheath by splitting the midrib with a sharp knife, so that its halves form a sturdy edge of the mouth of the basket (Pl. III, *B*). Oftentimes, such a *haapee* may be stuffed with its load of fruit before being closed with the plait. Oranges may be plaited into a basket in this fashion for safer carrying, the midrib not being split until the fruit is to be taken out.

Departing from this method of fashioning the leaflets on both sides of a section of midrib into a basket form, the third type of *haapee* uses only half a leaf, which has been split down its midrib. The section, perhaps 60 inches in length, the worker spreads on her lap, the strip of midrib towards her, the attached leaflets, right side up, slanting naturally as dextral elements, until she has twisted the alternate ones back to form the sinistrals. Some women always plait this *haapee* from right to left, handling all the sinistrals at once with the right hand, while they run the dextral element across, one at a time, with the left hand.

Both hands rise and fall with machine-like rapidity as each dextral is passed under, over and under the sinistrals in the regular check pattern. Having plaited in all the leaflets save the first two at the right end of the midrib and the last two at the left, and made a mat about 12 inches deep, the worker bends the split midrib into an oval, overlaps the ends for about 3 inches and ties them together. Using now the two elements left free at the right end of the midrib and the two hanging free at the left end, which cross each other as dextrals and sinistrals, she starts the closing of the mat and works in all the loose ends of dextrals from one end and sinistrals from the other in the checkerwork.

Pressing the sides into the oval, satchel-form, she closes the bottom of the basket in the following way: standing the basket on her lap, one side towards her, its mouth up, she first works on the inside of the basket. Selecting the inner layer of sinistrals and dextrals, the one from the far side, the other from the near side, she pulls these up inside the basket, plaits them together in regular checkerwork and twists the ends into a tight roll as she moves from left to right, knotting them temporarily at the other end. Turning the basket over so as to work on the outside, she crosses the other layer of elements—dextrals from the far side and sinistrals from the near—in the checker stroke, twisting their ends also into a roll lying along the other one. At the right end, she pulls the inner roll through to the outside of the basket, twists it in with the outer roll, threads the two back inside the basket and knots them to secure the corner.

Such an *haapee* (Pl. III, *C*) may be carried by handles of purau bark tied to the strong mouth of rib, and may be laced shut when desired.

Oini.—The lightning-like transformation of a section of coconut leaf into an *oini* is an hourly occurrence anywhere in the islands, and so similar in superficial appearance are the dozens which any casual observer may

see made, that they are likely to be considered a single basket form. The perception that those which are used as containers for food in the ovens, bananas, fish or pieces of pig, have no handles, and that those used for carrying fruits, chestnuts, or flowers are equipped with handles raises the question as to whether, after all, these *oini* are all made alike. In general appearance the processes of manufacture are apparently identical: a coconut leaf is always split along its midrib and cut into small sections called *tie,* to which a few leaflets adhere; these sections are always worked together in pairs and the pairs with one another, in regular checkerwork.

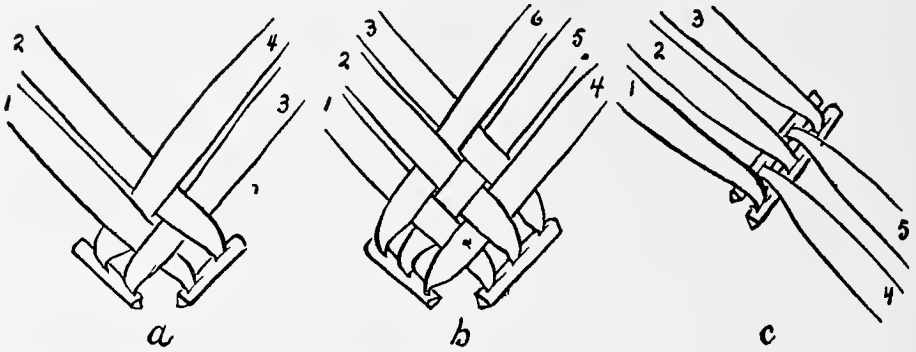


FIGURE 2.—Processes of starting *oini*: *a, b,* interweave sections of rib with their adhering leaflets; *c,* interlock sections.

As a matter of fact, the opportunities for variation within this method of manufacture have been fully taken advantage of by these clever craftsmen. Sometimes they cut the sections so short that only two leaflets adhere to each; sometimes they measure off three to a section; sometimes, four. They vary the method of uniting these sections into pairs: either plaiting the leaflets of the two together with the checker stroke, that is, interweaving them (fig. 2, *a, b*); or interlocking them, so that the leaflets run out from both sides of the joined midribs (fig. 2, *c*). They vary even the constitution of these pairs of sections, some being composed of a two-leaflet section and a three-leaflet section each. They vary the number of pairs combined to make a basket, sometimes using two pairs, sometimes four. The number of pairs employed, in conjunction with the particular method of folding the mat, seems to give to a basket its distinctive characteristics: the rib sections are prominently exposed at the ends of a basket built upon two pairs of *tie,* whose mat is folded vertically, and there are partially defined corners (*peho*), so that this type is called *oini peho;* the rib sections fall inside a basket built upon four pairs of *tie,* whose mat is folded horizontally, so that, contrary to the *oini peho* type, the inside is rough, the outside smooth. Very appropriately, the basket with the smooth

interior is used for cooking; that with the smooth exterior, for carrying. The leaflets plaited together to close the ends of a basket of two pairs of *tie* are gathered from the bottom and tied at the top; those in a basket of four pairs are gathered from the top, plaited together into a flap and tied in at the bottom. An *oini* of two pairs may or may not have handles, according to the stage at which the manufacture is considered complete; but all *oini* of four pairs have handles.

The *oini peho* may be built of two pairs of three-leaflet *tie* or of two pairs of four-leaflet *tie*. Since the four-leaflet *tie* is a larger basket which varies in no way from the three-leaflet *tie* in the method of manufacture, only the making of the *oini* of sections of triple leaflets need be described in detail. An accompaniment of feasts are these cooking baskets, being needed when bananas or pig are cooked in quantities. While the men attend to the heating of the stones for the ovens, the women gather in a sociable circle about a pile of coconut leaves, which the boys have gathered and split lengthwise for them, and make the cooking utensils. It is necessary to concentrate on a single worker, in order not to be confused by the wholesale manufacture which is going on.

The worker cuts off four sections of midrib, to each of which three leaflets adhere. Laying two of these in her lap, right side up, with the ribs towards her and the leaflets of the two crossing each other, so that she has three sinistral elements and three dextrals, she joins the two *tie* by plaiting the elements together with the usual checker stroke. She manages all the dextrals in her left hand, raising, pressing down, and raising each in proper order as she passes one sinistral at a time across with her right hand. When she has joined this pair of *tie* (fig. 2 *b*), she lays it aside and works the other two sections together in the same way. With the intention of plaiting together the two pairs thus formed, she places them on her lap, wrong side up, with the rib sections to the right and the left side, so that the leaflets of one pair cross those of the other in the center. Working from the center out, that is, plaiting away from her, she interweaves the elements from the two sides with the regular checkerwork stroke (fig. 3, *a*). Tying the ends in a temporary knot, she turns the mat (*tuati*) around; and, working from the center out again, plaits together the remaining elements from either side (fig. 3, *b*).

Her mat completed, swiftly and dextrously the worker folds it vertically, the right side of leaflets outside, through the center and between the two pairs of *tie* (fig. 3, *b*). The line on which the mat is folded determines the final stage of the manufacture and the resulting form of the *oini peho*. After folding the mat, the worker closes the basket in the following manner:

Standing it on her lap, one end towards her, she forms the corner on one side and then the other by making a sharp, right-angled turn in each lowermost element, thus: turning the lowermost dextral into a sinistral and passing it under and over the other two dextrals, and turning the lowermost sinistral into a dextral and passing it over and under the other two sinistrals (fig. 3, *c*). When she has

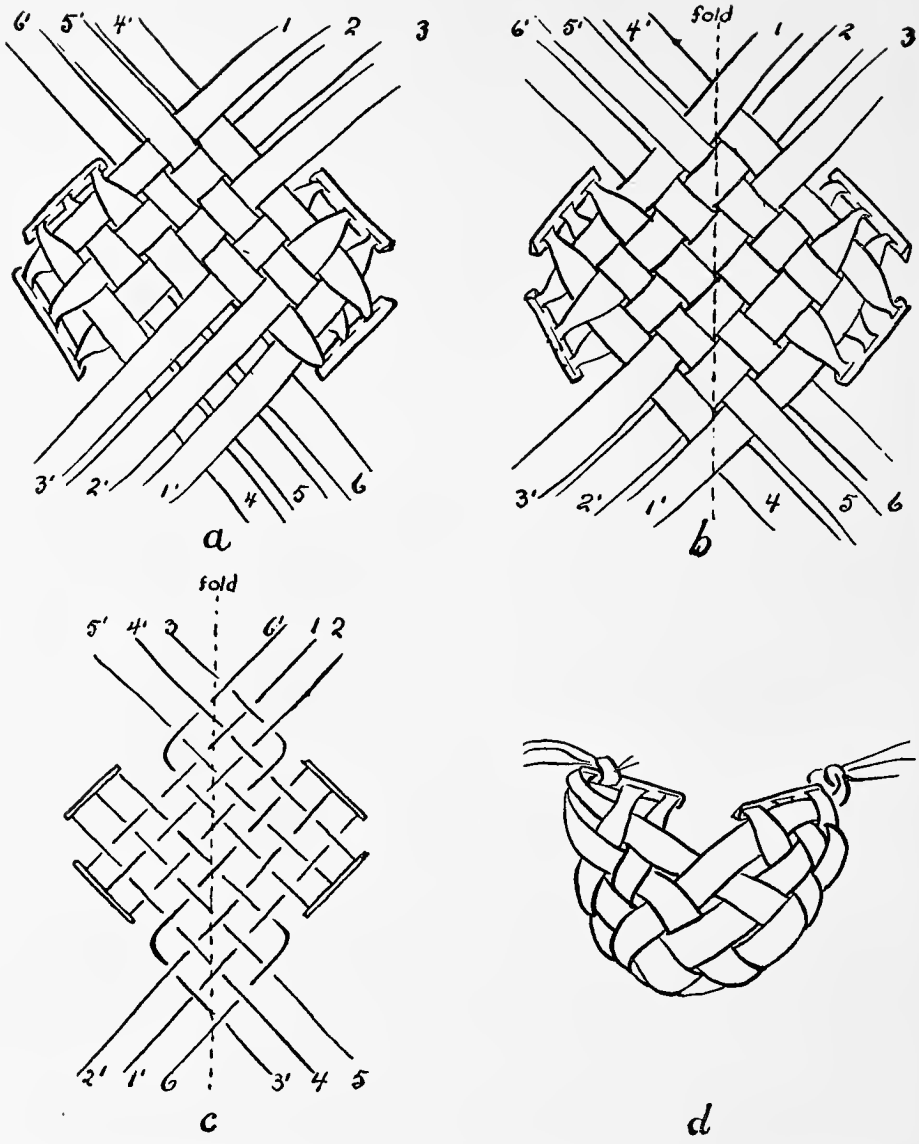


FIGURE 3.—Technique of the *oini peho*: *a*, plait from center up two interwoven pairs of three-leaflet sections; *b*, turn mat around and plait loose leaflets from center up; *c*, continue plaiting turning 3 and plaiting it across 1 and 2, turning 6′ and plaiting it across 5′ and 4′, crossing 3 and 6′, in regular checkerwork pattern, manipulating the corresponding elements on the opposite side similarly, folding mat on dotted line; *d*, complete end by threading opposite leaflets through spaces next midrib sections.

completed the checkerwork on the end by crossing these two elements which have just been folded, she threads each of the three dextrals, to continue the regular checkerwork, through the interstices left near the rib on the right side of the basket, and each of the three sinistrals through the interstices left near the rib on the left side (fig. 3, *d*). After turning the basket around and closing the other end in like manner, she secures the work either by knotting together the ends of the leaflets which meet in the middle of either side of the basket (Pl. IV, *A*) —this, the usual form for cooking, the rough ends being left to tie the mouth of the basket together when it is placed in the oven,—or she gathers the ends together into a three-ply plait on each side of the basket to form a handle when joined (Pl. IV, *B*). The ends of some she finishes very hastily, eliminating the corners, eliminating the threading of the pendant ends into the interstices near the opposite ribs, simply tying the pendant ends to the opposite rib sections (Pl. IV, *C*).

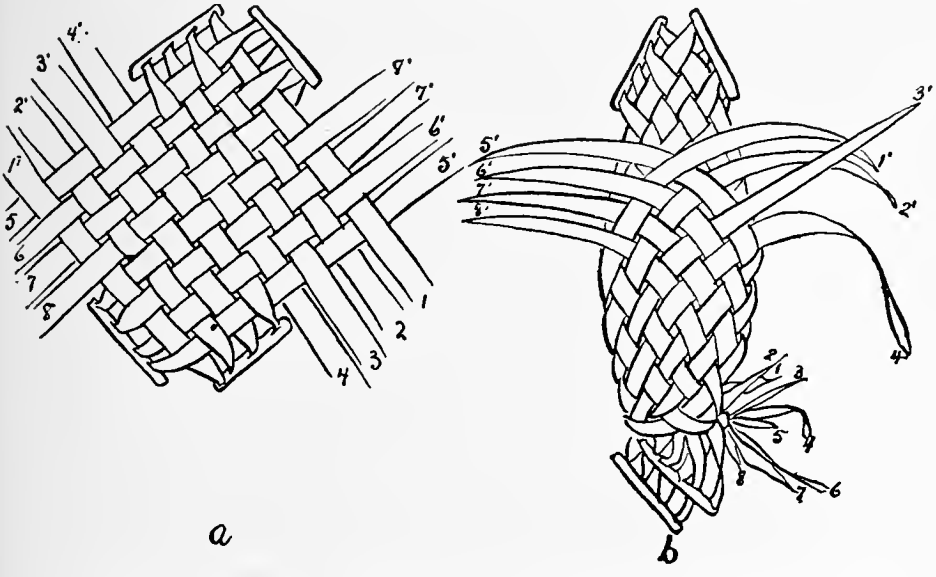


FIGURE 4.—Technique of making *pute ia* of coconut leaf sections: *a*, plait mat of two pairs of four-leaflet sections; *b*, roll mat into cylindrical form, plaiting crossing leaflets in checkerwork, tying bottom together with 1, 2, 3, 4, 5, 6, 7, 8, leaving top open to be tied when basket is filled.

The *pute ia,* a cylindrical matting in which fish is cooked, is a development from the *tuati,* which is made of two pairs of four leaflet sections. When such a sheath is desired, the worker completes her mat and turns it wrong side up and with the rib sections at top and bottom, instead of at the sides (fig. 4, *a*). The process of converting the mat into a cylindrical form is called *tapiri*:

Folding the mat vertically, the worker draws the leaflets together from either side, so as to plait them from the center up in the checkerwork stroke. Having interwoven this pair of fours, she carries their ends around the cylinder and ties them tightly above the rib sections to close this end of the tube. Turning the other

FIGURE 5.—Technique of making an *oini* of four pairs of two-leaflet sections of coconut leaves: *a*, interweave sections in pairs; *b*, interweave each two pairs; *c*, plait together two pairs of pairs; *d*, follow diagram in plaiting pattern, folding 1 to plait it across 2, 5, and 6, folding 2 to plait it across 5 and 6, folding 7′ to plait it across 8′, 3′, and 4′, folding 8′ to plait it across 3′ and 4′, folding leaflets to form opposite edge in similar fashion, also plaiting 7 and 8 across 1 and 2 and 1′ and 2′ across 7′ and 8′; *e*, close one end by knotting together 1 and 2, and 7 and 8 and stuffing them into mesh, close other end similarly; *f*, make handle by gathering 3, 4, 5 and 6 into three-ply plait on one end and 3′, 4′, 5′, and 6′ on the other, tying the two plaits together.

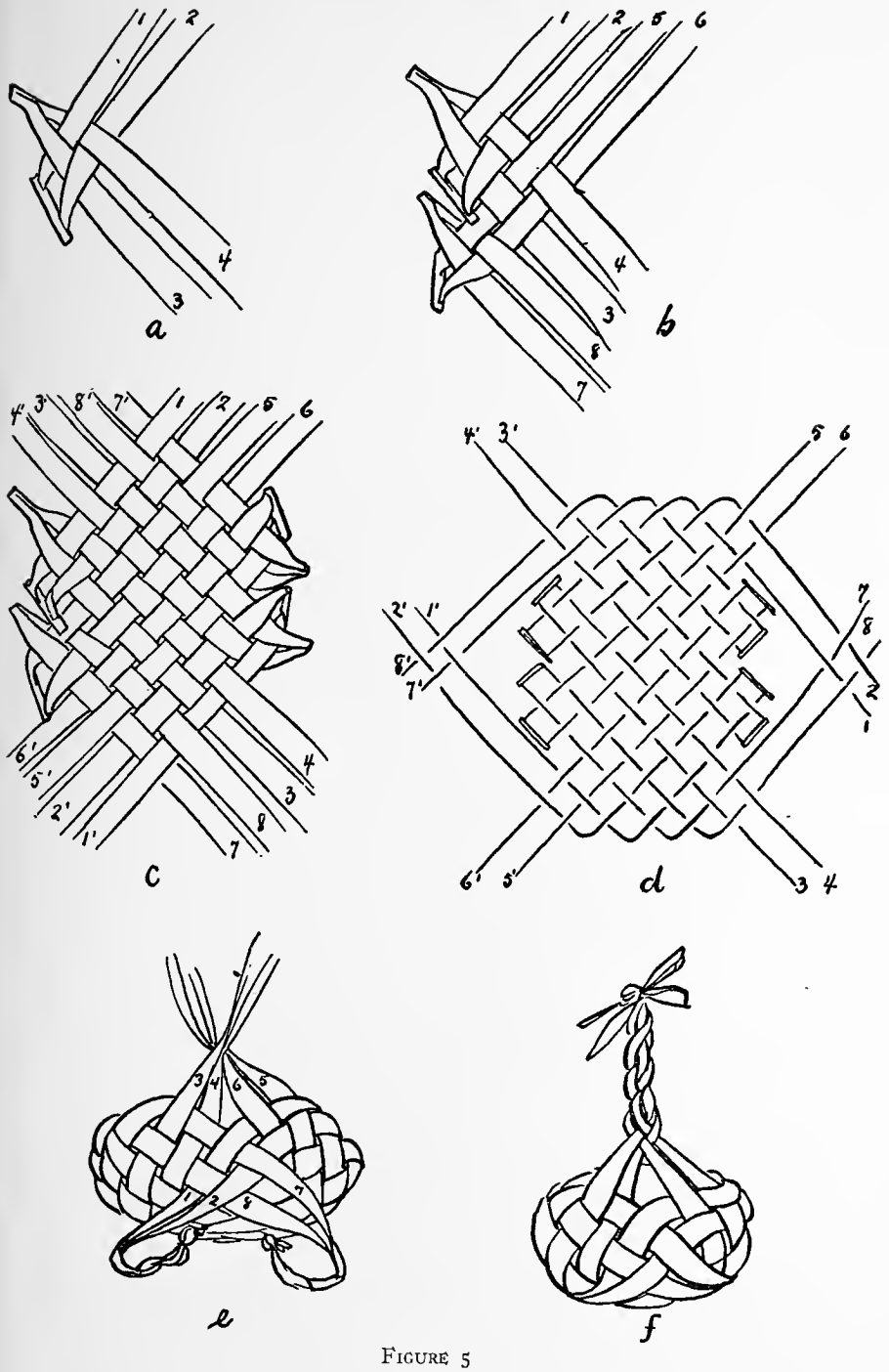


FIGURE 5

ribs uppermost, she then interweaves the other pair of four (fig. 4, *b*), tying their ends loosely around the cylinder (Pl. IV, *D*), but leaving this end open until it has been lined with purau leaves and stuffed with fish. Then she tightens the knot, closes this end of the *puteʻia* and puts it into the oven.

Of the *oini* built on four pairs of *tie,* some are started by interweaving the leaflets of each pair (fig. 2, *a, b*), some by interlocking them (fig. 2, *c*). There is an *oinì* used for carrying fruits, vegetables, and the like, which is made of four pairs of sections of two leaflets each (Pl. V, *A*). Interweaving is employed to interlace these pairs (fig. 5, *a*):

Two pairs are crossed and plaited together in the usual checkerwork (fig. 5, *b*). A second unit of two pairs of *tie* having been similarly compounded, they are laid, one on either side of the lap, with the rib sections right and left and the leaflets of the one unit crossing those of the other between. The dextral and sinistral elements are then plaited from the center out, the mat is turned around and the other set of dextrals and sinistrals similarly interwoven (fig. 5, *c*). The method now departs from the simple treatment of the mat; the pendant leaflets are turned back to form an edge on the far and on the near sides of the mat, which shall later act as the rim of the basket. The four central leaflets, two sinistrals and two dextrals, are thus manipulated to form each edge: the sinistral to the left of the center of the mat is turned to the left in a right-angled curve and plaited across the other three sinistrals; the next sinistral to the left is similarly turned and plaited across the remaining two sinistrals (fig. 5, *d*); the two central dextral elements are turned one at a time to the right and plaited across the remaining dextrals. When a corresponding edge has been turned on the opposite side of the mat, there are at each corner four pendant leaflets, which fall in pairs according to their lines of direction (fig. 5, *d*). A horizontal folding of the mat, with the right side of the leaflets on the outside, results in two sets of crossing elements at either end, one of two dextrals and two sinistrals slanting down and one of two dextrals and two sinistrals slanting up. The end of the basket is closed by plaiting together the downward sloping elements into a small flap, which is drawn tightly down over the end and secured by threading the ends of the leaflets into the interstices on the bottom of the basket and knotting them inside (fig. 5, *e*). The remaining upward slanting elements go towards the making of a handle, being gathered together into a three-ply plait (fig. 5, *f*).

The *oini* built of four interlocked pairs of rib sections, though of the general style of those of interwoven pairs, differ somewhat in manufacture and in form. Requiring more plaiting, they are deeper and many are smaller mouthed than the others and hence usable for different purposes. The following *oini* of this type were made for me by a young man, who delighted to show me the variations which may be evolved from this basis: He started with the usual style of *oini* in the Leeward Islands, one combining a two-leaflet and a three-leaflet section in each pair and utilizing four such pairs.

Having interlocked each pair of sections, so that the leaflets fell on opposite sides of the parallel rib sections (fig. 6, *a*), he began the checkerwork with two pairs, laying them in his lap so that the three leaflets of one crossed the three leaflets of the other and could be plaited together in the usual way (fig. 6, *b*). He laid

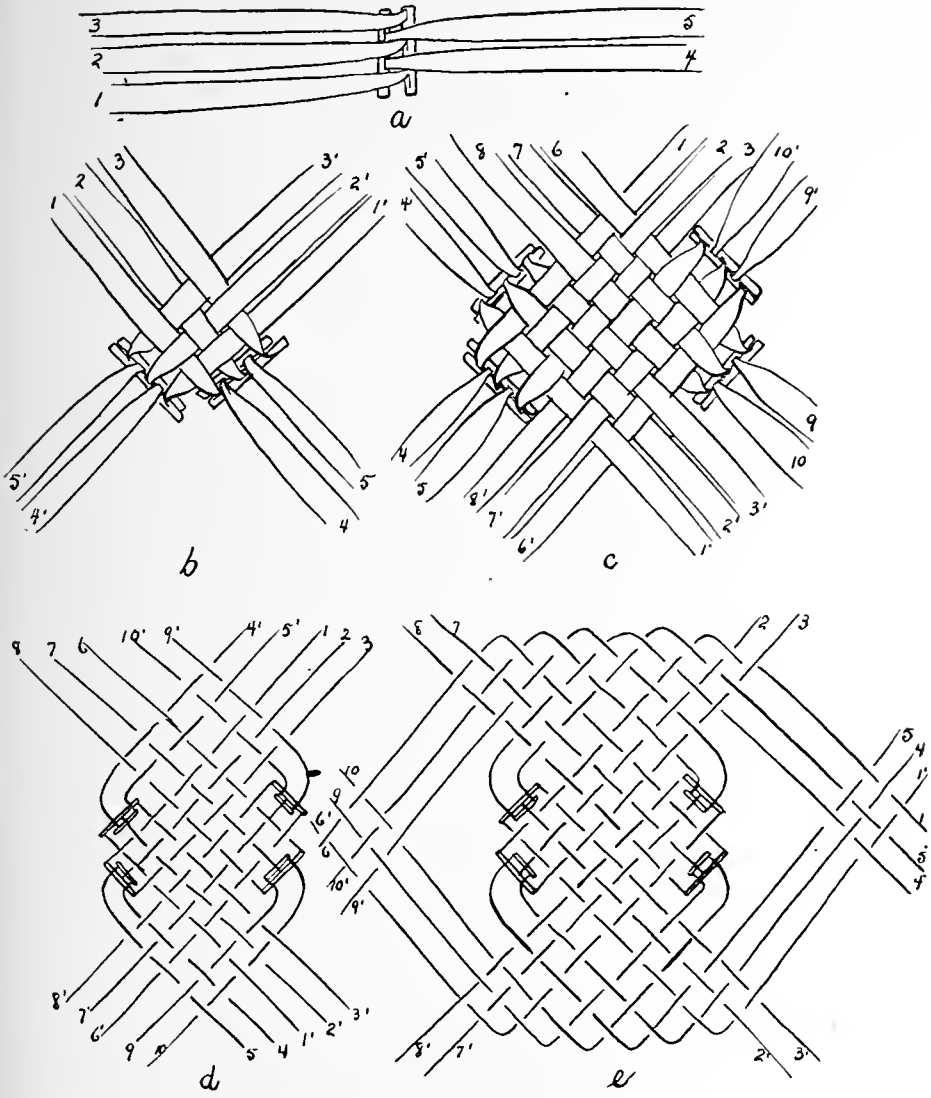


FIGURE 6.—Technique of making an *oini* of four interlocked pairs of coconut leaf sections: *a*, interlock two-leaflet and three-leaflet section; *b*, plait together three-leaflet sections of each interlocked pair; *c*, plait together two pairs of plaited three-leaflet sections; *d*, follow diagram for pattern of the checkerwork, turning 10′ and 9′ to plait across 3, 2, 1; turning 5′ and 4′ to plait across 8, 7, 6, then plaiting 10′ and 9′ across 5′ and 4′, turning 9, 10, 4, 5 similarly on opposite side of mat and plaiting them in same fashion; *e*, continuing pattern, turn 4′ and plait it across 5′, 1, 2, 3, turn 5′ and plait it across 1, 2, 3, turn 1 and plait it across 2, 3, turn 9′ and plait it across 10′, 6, 7, 8, turn 10′ and plait it across 6, 7, 8, turn 6 and plait it across 7 and 8, repeat process on opposite side with 10, 9, 6′ and 5, 4, 1, plait 4′, 5′, and 1 across 5, 4, 1′, plait 9′, 10′ and 6 across 10, 9, 6.

FIGURE 7.—Checkerwork pattern of *oini aua haro*: *a*, plait together four three-leaflet sections of four interlocked pairs of three-leaflet sections, turn 12′, 11′, and 10′ and plait them across 3, 2, and 1, turn 12, 11, and 10 and plait them across 3′, 2′ and 1′, plait 12′, 11′, and 10′ across 12, 11, and 10, manipulate corresponding elements on the opposite side in similar manner; *b, incline* 1, 2, 3 and 10, 11, 12 towards each other and plait them across each other, incline 1′, 2′, 3′ and 10′, 11′, and 12′ towards each other and plait them across each other; manipulate the corresponding elements on opposite side similarly, fold the mat and plait 10, 11, 12 across 6, 5, 4 and 10′, 11′, 12′ across 6′, 5′, 4′ for the end flaps, and plait 1, 2, 3 across 1′, 2′, 3′, and 7, 8, 9 across 7′, 8′, 9′.

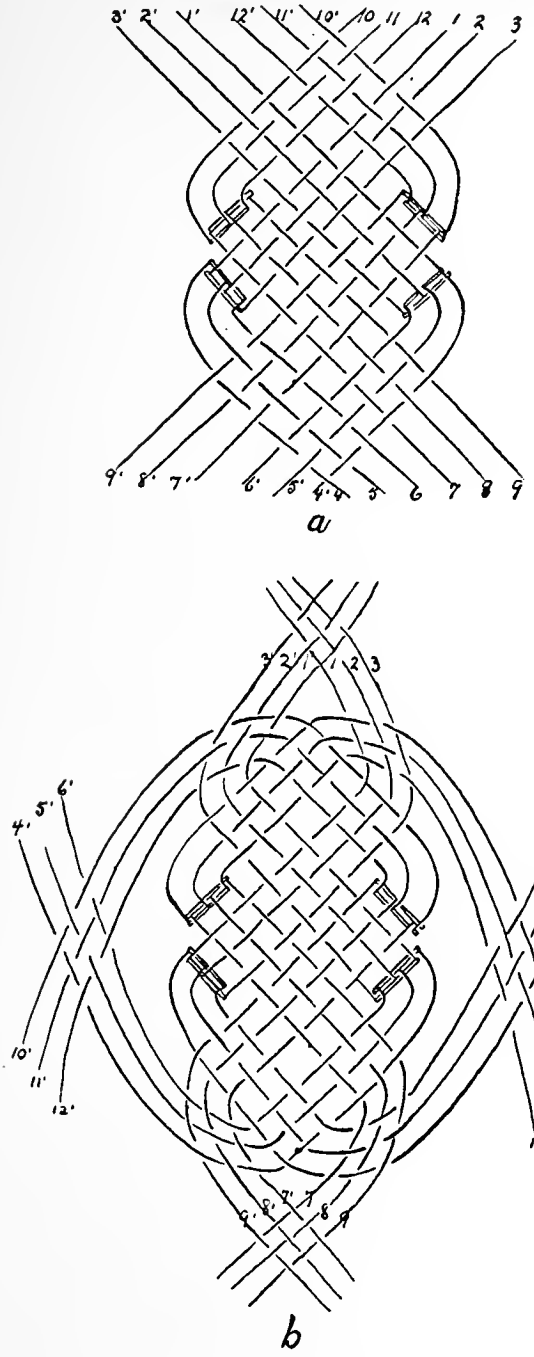

3' 2' 1' 12' 11' 10' 10 11 12 1 2 3
9' 8' 7' 6' 5' 4' 4 5 6 7 8 9
a
3' 2' 1' 1 2 3
4' 5' 6'
10' 11' 12'
6 5 4
10 11 12
9' 8' 7' 7 8 9
b

FIGURE 7

aside these joined pairs, while he plaited together the triple elements of the other two pairs preparatory to forming the familiar *tuati.* When he had completed the mat in the usual manner, by joining the two larger units, plaiting the dextrals from one with the sinistrals from the other from the center out and turning the mat around for the other set (fig. 6, *c*), he entered upon the technique which distinguishes this type of *oini* from those formerly described.

Up to this point, the two leaflet sections of midrib had not been used, but at this stage of the manufacture were lying parallel with the adjacent elements plaited through from the opposite side of the mat. Thus there were five pendant leaflets at each corner of the mat, three which had been plaited through the body of the mat, two as yet unused. He now worked at each corner. At the upper right hand corner, he turned them towards the center to act as sinistrals in crossing the three adjacent dextrals; at the upper left hand corner he turned them as dextrals to cross the adjacent sinistrals. Having plaited these elements through, two from one side and two from the other, he continued the checkerwork in the center by plaiting these four working elements together where they crossed (fig. 6, *d*). The same process he followed on the other two corners by turning the mat around and working out from him. This completed the variation from the technique of the *oini* form, which is built upon four interwoven pairs of two-leaflet sections. Thereafter he employed the identical method of turning the edges (fig. 6, *e*) and of plaiting the flap to close each end (figs. 5, *e;* 6, *e*) and of gathering the top leaflets into a plaited handle (fig. 5, *f*), the increased number of leaflets to be manipulated in no way interfering with the method.

He tossed this basket aside, and started a more complicated variation in great glee. This he called the *oini aua haro,* which I translate "the *oini* with the enclosure pulled tight," since it was a very small-mouthed basket (Pl. V, *B.*)

He cut eight sections of split midrib with three leaflets adhering to each and interlocked them in pairs. Following the procedure just described, he rapidly transformed them into the usual mat and followed the method of the previous basket in plaiting in the unused elements at the corners, there being three instead of two elements to turn across their adjacent elements and finally to plait together in the middle (fig. 7, *a*). He followed this, not with the edge of the form just described, but, omitting this stroke altogether, went on adding to the checkerwork of the mat by making small triangular appendages at the corners. This he accomplished by separating the six pendant leaflets at each corner into threes and inclining the two groups towards each other as sinistrals and dextrals, which he interwove in the usual checkerwork (fig. 7, *b*). He was now ready to fold the mat and close the ends of the basket, which he did in the manner just described, plaiting the downward sloping elements into flaps to be drawn down over the end openings and securing them by threading the ends into the bottom and knotting them inside. But he added a bit more checkerwork before plaiting his handle from the upward slanting elements, by plaiting through one another the three elements from the one side and the three from the other at either end. These additional bits of mat filled in the mouth of the basket at either end and when he had gathered the ends pendant from them into a three-ply plait and tied the handle in the middle, the small-mouthed *oini aua haro* was complete.

My young friend was by this time stimulated to such an exhibition of craftsmanship, that I could hardly follow the rapid evolution of the next basket he made. The *oini peho maha* (basket with four corners) he like-

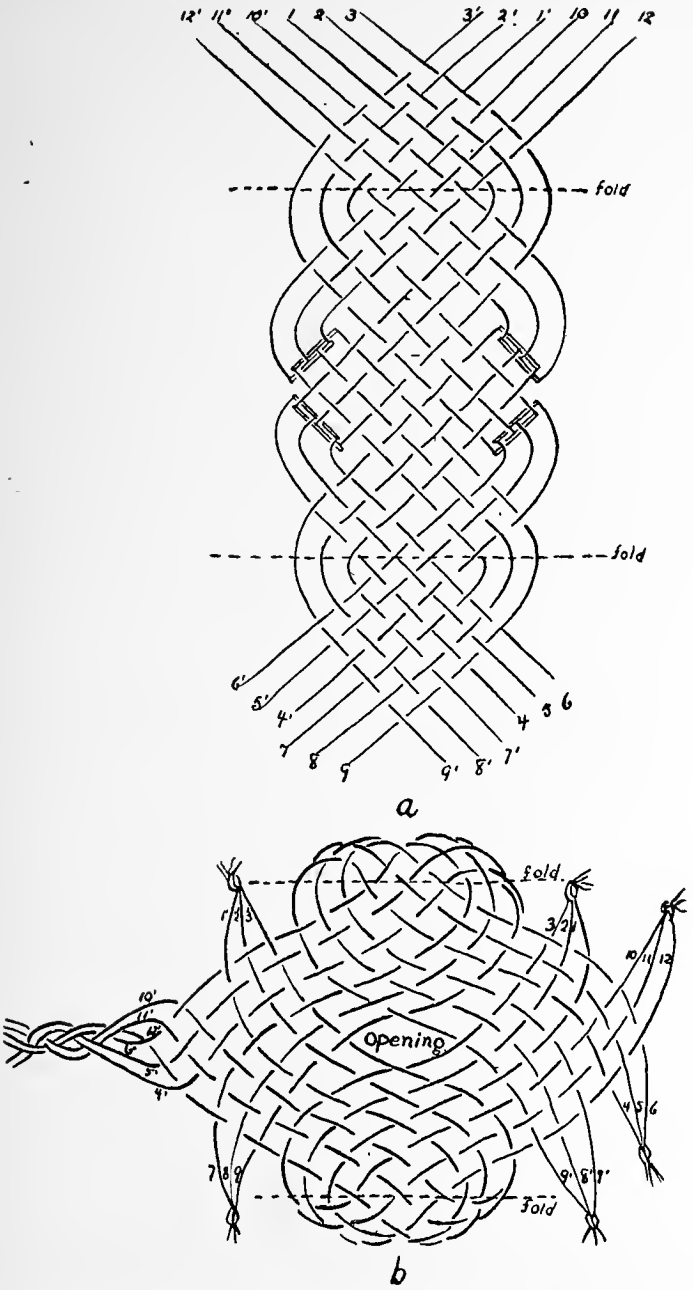


FIGURE 8.—Diagram of checkerwork pattern of *oini peho maha: a*, plait together four three-leaflet sections of four pairs of interlocked three-leaflet sections, turn 12′, 11′, 10′ and plait them across 3, 2, 1, turn 12, 11, 10 and plait them across 3′, 2′, 1′, plait 12′, 11′, 10′ across 12, 11, 10, turn 1, 2, 3 and plait them across 12, 11, 10, turn 1′, 2′, 3′ and plait them across 12′, 11′, 10′, plait 1, 2, 3 across 1′, 2′, 3′; *b*, roll mat on dotted lines, plait 3′, 2′, 1′, 10, 11, 12 across 9′, 8′, 7′, 4, 5, 6, manipulate corresponding elements on opposite side similarly, separate hanging elements on one side into four triplets and knot each triplet together, on the other side knot 7, 8, 9 together and 1′, 2′, and 3′, gather 4′, 5′, 6′, 10′, 11′, 12′ into three-ply plait for handle, stuff knots into mesh of basket to close it.

wise built upon four pairs of interlocked midrib sections of three leaflets each, but this form being intended for carrying home live shrimps from the river, he plaited in effect a cover across it, which he tied tightly over one end and left slightly open at the other so that shrimps dropped through the aperature would not be likely to escape. He repeated the process of making the mat to the point where he had previously added the triangular appendages of checkerwork to each corner (fig. 7, *b*). This move he varied a trifle. Where he had inclined the two groups of threes equally towards each other, he now turned the outside three elements sharply at right angles, so that the inner three elements continued in their direction and the outer three were plaited through them (fig. 8, *a*). It was this sharp turning of the outer elements which created the four corners. Again he used the checker stroke in plaiting together these outer groups of three elements each where they crossed in the middle, and the elaborate *tuati* was ready to turn up into basket form:

He rolled it horizontally, so that the leaflets pendant from the near edge and the far edge crossed one another as two sets of six dextral and six sinistral elements each (fig. 8, *b*). Turning the basket, so as to plait from the center out, he interwove with the checker stroke a set of these elements, six from one side and six from the other; and, separating the hanging ends into groups of three leaflets each, he used these ends to tie the flap of the cover down over the midrib sections on that side by threading them into the interstices of the bottom of the basket and knotting them inside. This end closed securely, he turned the basket around and plaited the other set of elements, six from one side and six from the other, together in checkerwork, proceeding as before from the center out, and dividing the ends again into groups of three elements each. But this time he threaded only the two outer groups of threes over the rib sections and into the bottom mesh of the basket, where he knotted them. The two central groups he gathered into a three ply plait, which made a single cordlike handle and which left a small opening over the midrib sections into which he could thrust his shrimps (Pl. V, *C*).

The successful evolution of this basket reminded him of another form used for carrying shrimps called the *oini aua a piti* (basket with two openings). This form he built also upon four pairs of interlocked midrib sections, but he compounded each pair of a two-leaflet and a three-leaflet section:

Starting the mat by interweaving the three-leaflet parts of the pairs, as in figure 6, *b*, he worked the outer two-leaflet sections in in the former way, as in figure 6, *d*, plaiting them first across the adjacent three elements and then across one another in the middle. In working the five elements at each corner, he now followed the method of the *oini aua haro,* inclining the two groups equally towards each other for the plaiting, though this time he was handling a two-leaflet and a three-leaflet group (fig. 9, *a*). At this point, however, he diverged, with increased speed, so as to surprise me with the very different result. Instead of plaiting together the two three-leaflet groups where they naturally crossed one another in the middle after being worked across the two-leaflet groups, he rolled the mat up into basket form and plaited in each three-leaflet group with the group from the opposite side

of the mat, which fell across it (fig. 9, *b*). This resulted in a strip of checkerwork across the top of the basket and he gathered the pendant ends of leaflets on either side of it into a three-ply plait and knotted the two together for a handle. This treatment of the three-leaflet groups left a hole at the base of each handle, so that there were two tiny mouths, as the name *oini aua a piti* indicated (Pl. V, *D*). His final move in finishing the basket was to plait together the two groups of two leaflets at either end into small flaps, which he drew down over the end openings and fastened by stuffing the ends of the leaflets into the bottom mesh and knotting them inside.

Ete.—So seldom is the carrying satchel of lauhala (*ete paeore*) made today that I was unable to watch the actual and complete process of manufacture; but it is possible to indicate its nature from conversations concerning it, from an actual lesson in the making of the edge strokes and from a study of finished satchels.

The leaves, prepared as described on page 7, are taken from their roll and softened for use. This is accomplished by running a leaf several times across the edge of a clam shell held in the right hand. After the last pass, the butt end of a leaf is pressed against the sharp edge and pinched off. The width of each element which goes into the making of a basket of *paeore* (p. 7) varies from perhaps 3/16 to 5/8 inch, and the leaves are stripped into the desired width in the following way:

The mussel shell is prepared as an instrument by cutting it straight across its width so that there are two sharp points left which may be used. The shell is held, points down, between the right thumb and index finger. The leaf to be stripped is placed under one point and held against it by the right middle finger. The left hand is then free to draw the leaf towards the worker, while the right hand pushes the shell away, and the leaf is neatly stripped. The stripping is started about 10 inches from the butt end and carried to the tip; then the leaf is turned about and stripped towards the butt, thus freeing the last 10 inches or so.

When the worker has prepared a bunch of these strips of the desired width, she makes first the edge of the basket, known as *taratara hiti* (thorn edge) because of its pointed appearance.

Starting with two strips, she crosses them at a point about two inches from their ends, holds one horizontally across the other in vertical alignment (fig. 10, *a*), folds the vertical member around the horizontal and doubles it on itself (fig. 10, *b*), and folds the horizontal member to the left around the vertical and doubles it under on itself (fig. 10, *c*). When a second unit of two strips has been composed in like manner, one is laid upon the other and the first doubled vertical is folded down across the doubled horizontal of the second unit (figs. 10, *d*, *e*). The joined units are laid on the floor in front of the worker with the points towards her, so that the horizontals and verticals, become sinistrals and dextrals (fig. 10, *f*). Each new unit of two is added by laying its sinistral across the dextral of the preceding unit, and folding that dextral back around it, where it is held until the next unit is added and the dextral is let fall over the new sinistral (fig. 10, *g*). Checkerwork is thus gradually instituted to bind together the separate units into a border of doubled elements with an ornamental pointed edge.

FIGURE 9.—Diagram of checkerwork pattern of *oini aua a piti: a,* plait together three-leaflet sections of four pairs of interlocked three-leaflet-two-leaflet sections, turn 10′ and 9′ and plait them across 3, 2, 1, turn 10 and 9 and plait them across 3′, 2′, 1′, manipulate corresponding elements on opposite side in like manner, incline 1, 2, 3 and 9, 10 towards each other and plait them across each other, manipulate similarly 1′, 2′, 3′ with 9′, 10′, also 6, 7, 8 with 5, 4, also 6′, 7′, 8′ with ′4, 5′; *b,* roll mat on dotted lines, plait 1′, 2′, 3′ across 8, 7, 6, and 1, 2, 3, across 8′, 7′, 6′, thereafter plait 1′, 2′, 3′ across 1, 2, 3, and 6′, 7′, 8′ across 6, 7, 8, gather 1′, 2′, 3′, 1, 2, 3 into a three-ply plait for a handle, gather 6′, 7′, 8′, 6, 7, 8 into another three-ply plait for handle, plait 5, 4 across 10′, 9′ and 5′, 4′ across 10, 9, knot them in pairs to stuff into mesh.

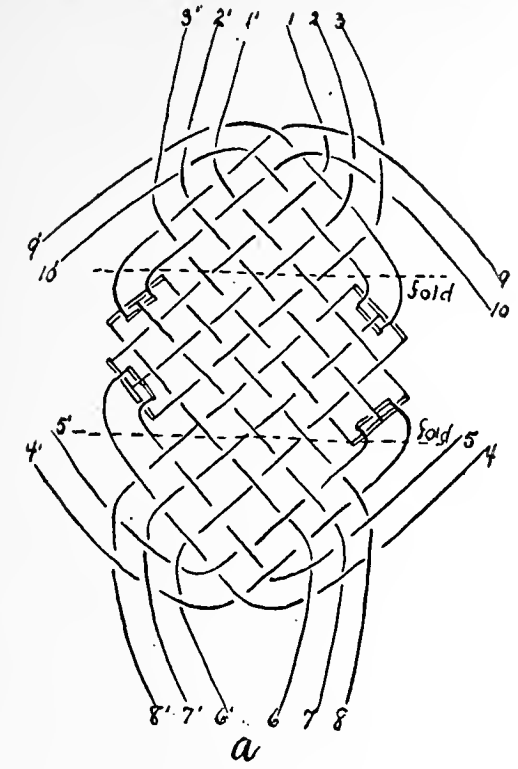

3' 2' 1' 1 2 3
9'
10'
fold
9
10
5'
fold
5
4'
4
8' 7' 6' 6 7 8
a
fold
4'
5'
9
10
5
4
10'
9'
fold
b

FIGURE 9

When a strip of border 1½ or 2 inches wide and from 14 to 30 inches long has been plaited thus with the checker stroke and the *taratara* edge, the strip is doubled and its ends woven together, so that the main body of the basket of checkerwork may be woven round and round, building up the cylindrical form to the desired depth. In the joining of the border, the elements from the one side are pushed into the weave of the other with a needle and cut off when secure.

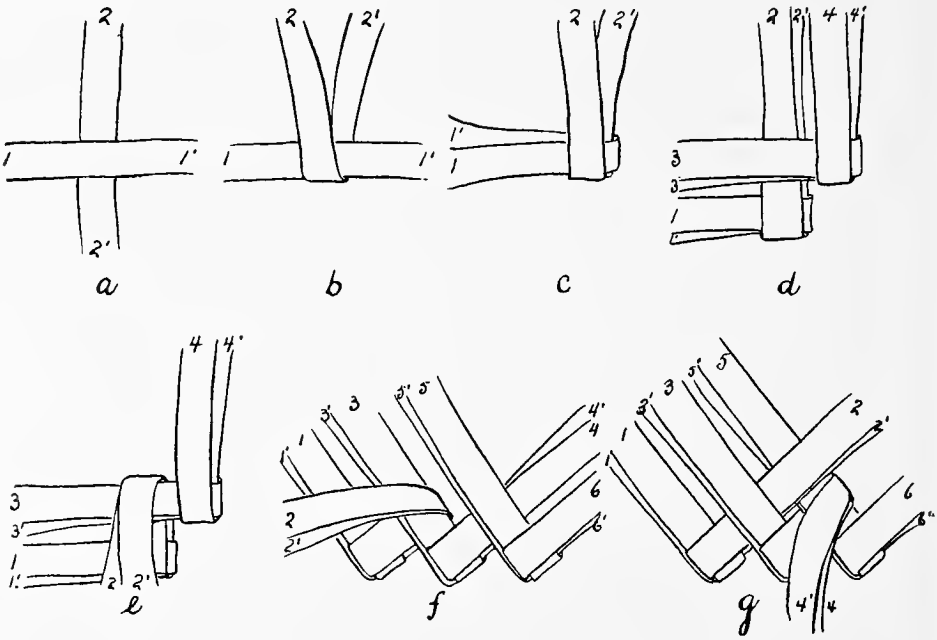


FIGURE 10.—Technique of starting checkerwork satchel of lauhala: *a*, cross 1-1′ and 2-2′ at right angles; *b*, fold 2 about 1-1′ and lay it on top of 2′; *c*, fold 1′ about 2′ and lay it under 1; *d*, lay a similar unit of 3-3′ and 4-4′ on top of first one; *e*, fold 2 and 2′ over 3 and 3′; *f*, turn work about and add another unit, 5-5′ and 6-6′ on top of 4 and 4′; *g*, fold 4 and 4′ forward over 5 and 5′, fold 2 and 2′ back over 5 and 5′.

The mat complete to a depth of from 6 to 12 inches, the worker presses it into the flat satchel shape and joins the sides along the line of the bottom in the manner of the *ara iri* bottom closing (see pp. 44-48), the outer set of elements being tied back, the inner set crossed in the checkerwork and pulled tight, and both sets of elements being gathered up in pairs into the *taviri* stroke (p. 18). When the ends of the elements dropped from this plait are cut off short, the basket is complete, save for a plaited handle made separately and fastened to the basket.

TWILLED WORK

Ara'iri of twilled-threes.—In the manufacture of the coconut leaf basket of twilled-threes, called today the *ara iri,* anciently sometimes called the *ara papa,* the people of the Society Islands make use of yet another manner of arrangement of the leaf sections, as well as strokes other than the common checkerwork. In the forms of the *haapee* (p. 18), the leaflets along a midrib, or half a rib, are converted into dextral and sinistral elements for checkerwork by twisting every other leaflet out of its normal line of growth so as to cross the adjacent leaflet. In all forms of the *oini* the leaflets on different short sections of rib are laid across one another in sinistral and dextral directions. It remains for the *ara iri* to superpose the leaflets of the right side of the midrib on those of the left side, so as to use them as a layer of sinistrals on top of a layer of dextrals.

The *ara iri* is the only coconut leaf basket in whose manufacture there is any pride of craftsmanship, and of the two forms, it is the twilled-threes for which more pains are taken (Pl. VI, *A*). The old woman of Maupiti who taught me how to make the twilled-threes (Pl. I) was very careful in her selection and preparation of material. She searched until she found two young coconut leaves of about equal length. The process of toughening them by drawing them across a blazing fire (pp. 6, 7) she attended to herself. When she withdrew them, every leaflet was folded tightly along its midrib and she left them so throughout the entire work, plaiting them double. The midribs of these young leaves were of no great girth, but, after splitting each *tie* in half, she reduced them to the thinnest strip of fiber which would afford secure attachment for the leaflets. This process she completed with a knife, paring away the fiber; but the thinning of the midrib was partly accomplished in conjunction with the removal of the edges of the leaflets: for, in order to obtain the fine and uniform appearance of the twill pattern, she stripped off the edges of the folded leaflets with her thumb nail and pulled away the fibers in the midrib to which each edge adhered. The width of the elements for the *ara iri* has been standardized: for baskets of the ordinary size, 5/16 inch; for smaller baskets, 3/16 to 1/4 inch.

She had now four half-leaves (*iaau*); and these she cut of equal length—40 inches. Some *iaau* are cut longer, perhaps 46 inches long; some about 30 inches for smaller baskets; but on each *iaau* a few extra inches are left at the butt ends, from which the leaflets are pared, the fibers being retained for strings to tie the basket mat into cylindrical form.

The great reduction in the width of the folded leaflets necessitates the binding together of two right side *iaau* and of two left side *iaau,* so that the leaflets of one will fill the spaces left between the leaflets of the other.

To this end, the old woman selected the two *iaau*, which came from the right sides of the leaves, and laid them one on top of the other, rib to rib, so as to work straight out from her, from butt to tip, binding together the two right side *iaau* and subsequently the two left ones, forming a very attractive edge for the basket. She handled three elements in each *taviri* stroke in the following manner: Selecting the element nearest her, of the upper *iaau* and the second nearest of the lower *iaau*, she held them together in her right hand, while she reached under with her left hand and drew the first element of the lower *iaau* around towards the left, crossed it over the two elements held in her right hand, and pressed it down out of the way (figs. 11, *a, b*). In the next stroke, the second member of the former triplet became the first of the new group, the lowermost element which she twisted around to the left and over the remaining two of the triplet composed of one element from each *iaau* (fig. 11, *c*). Thus she continued the *taviri* stroke from near end to far end of the ribs, renumbering the working triplets each time, adding a third as the first dropped out, always twisting the first around the other two, always selecting one element from each *iaau* to form the second and the third of the triplet (figs. 11, *d, e*). Having bound together the two left side *iaau* with the same *taviri* stroke, she was equipped with two sections of closely spaced leaflets. These she placed in front of her with the stout *taviri* edges running horizontally, one on the other, the section of right side *iaau* on top of the section of left side *iaau*, so that the upper layer of leaflets fell as sinistral elements and the lower layer as dextral.

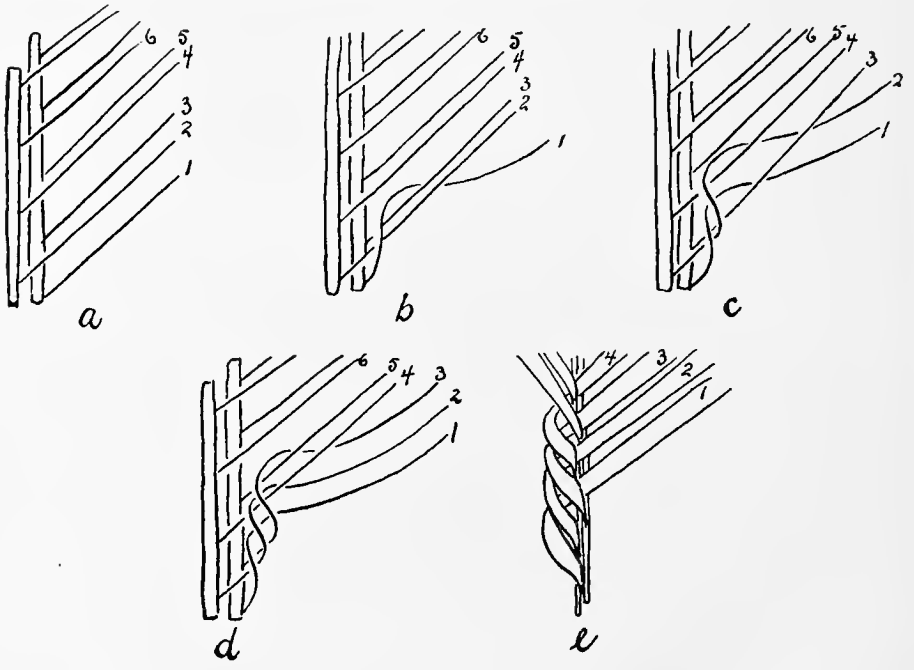


FIGURE 11.—Technique of *taviri* edge of *ara iri* of twilled-threes: *a*, arrange two right hand sections of coconut leaf, one on top of the other; *b*, twist 1 (lower section) around 2 (upper section) and 3 (lower section); *c*, twist 2 around 3 and 4 (upper section); *d*, twist 3 around 4 and 5 (lower section); *e*, finished appearance of *taviri* edge uniting two sections of coconut leaf, both from same side of the midrib.

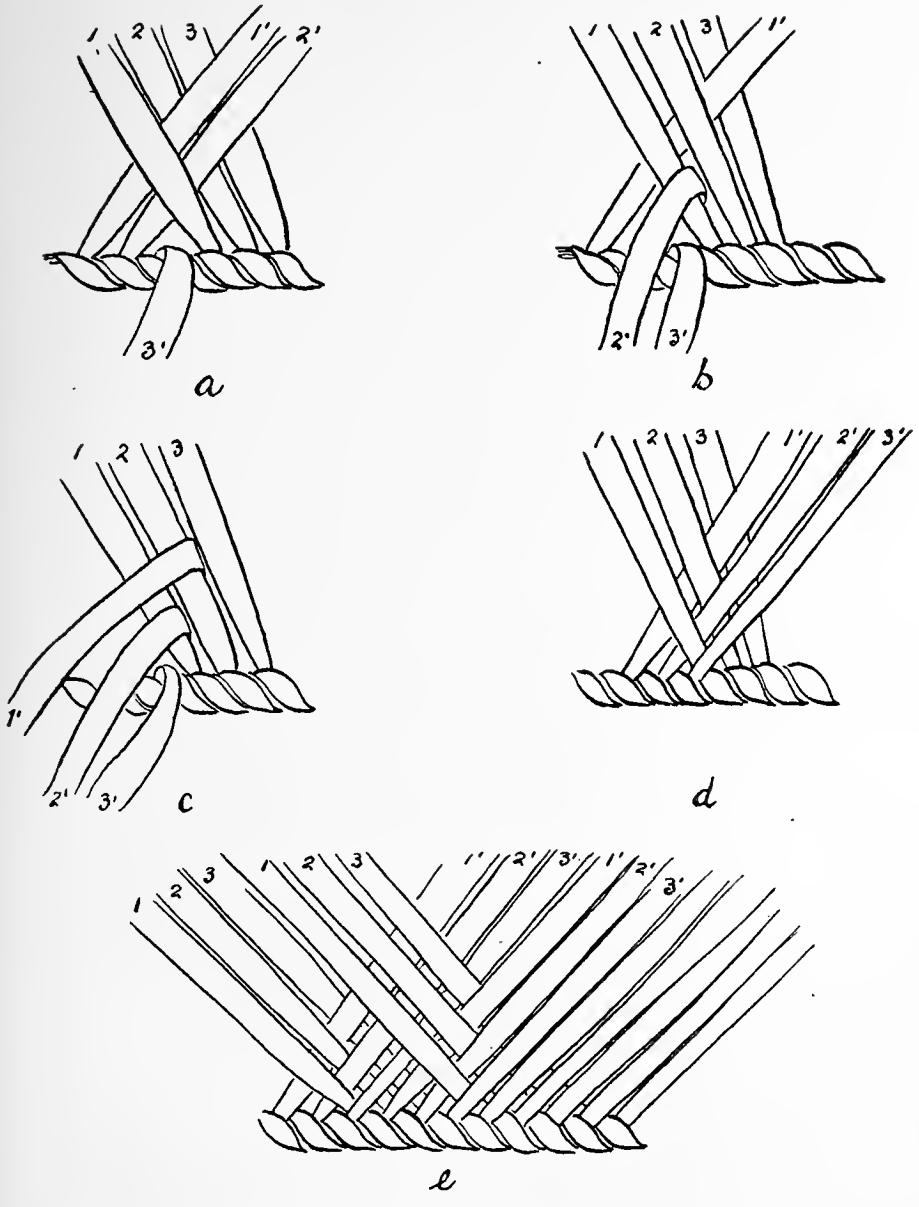


FIGURE 12.—Technique of preparatory stroke for twilled-threes of the *ara iri*: *a*, raise dextral 3′ and pass sinistral 1 across over dextrals 1′ and 2′; *b*, raise dextral 2′ and pass sinistral 2 across over dextral 1; *c*, raise dextral 1′ and pass sinistral 3 across; *d*, let fall the three dextrals; *e*, continue thus to the right each time with set of three dextrals and three sinistrals.

Then she turned to me to indicate that she was ready to enter upon the second stage of the manufacture of the *ara iri,* the main body of plaiting, which she called *raraa.*

The first row of strokes of the *raraa* she laid down merely as preparation for the twilled-threes. With great deliberation she arranged the two layers evenly with *taviri* edge on top of *taviri* edge. Emphasizing each stroke with a grunt, to which I was expected to respond in kind as a signal that I understood it, she began to fasten the two layers together by a single row of strokes moving from left to right.

The first three sinistrals she left to be used later in tying the mouth of the basket into its oval form. Two more triplets of sinistrals she left and two of dextrals at the left end of the *iaau,* for later use in the closing of the end of the basket, tying them loosely to keep them out of the way. She began to work, then, with the fourth sinistral triplet, that is, with the tenth sinistral element and with the third dextral triplet, or the seventh dextral element. For purposes of description, the numbering may begin with these first working elements: 1, 2, 3 for the sinistrals and 1′, 2′, and 3′ for the dextrals, for she handled three sinistrals and three dextrals in each stroke and then passed on to the next two threes on the right. Manipulating the three sinistrals in her right hand and the three dextrals in her left, she raised and lowered the dextrals in the proper order by turning her wrist, while she passed the sinistrals across them one by one in the following order: she raised dextral 3′, the right hand member of the triplet, and passed sinistral 1, or the left hand member of that triplet, across under it and over dextrals 2′ and 1′, which she left as two lower elements (fig. 12, *a*). Thereupon, she raised the middle dextral, 2′, and held it up with dextral 3′, so that there were two raised elements under which she passed sinistral 2, and only one dextral, 1′, left as a lower element for the sinistral to cross over (fig. 12, *b*). She then raised dextral 1′ and held it up with the dextrals 2′ and 3′, and passed sinistral 3 under all three dextrals (fig. 12, *c*). When she had dropped the dextrals in place, this stroke was complete (fig. 12, *d*), and she moved on to the next dextral and sinistral triplets (fig. 12, *e*). As she continued to work thus from left to right, until she reached the other end of the *taviri,* she occasionally filled an awkward space between the leaflets by inserting an extra leaflet, folded and stripped to its proper width, thrusting its butt end into the tight *taviri* twist and treating it as a regular member of the triplet in whichever layer it was placed.

This preparatory row of strokes complete, the old woman turned again to the left side to start the twilled-threes.

In addition to the six elements from each layer left for the closing of the end of the basket, she passed over also the first sinistral triplet worked in the row just finished, since this naturally would fall across the dextrals used in the closing of the end. Starting, then, with the thirteenth sinistral, she gathered up a handful of sinistral elements in her right hand and selected with her left hand the three dextrals lying directly under the first three sinistrals just picked up (fig. 13, *a*). Leaving the right hand member of this dextral triplet as a lower element, she replaced it by adding the dextral element adjacent on the left of the triplet. This selection of a working dextral triplet having been made, she raised all three of these dextrals, passed the first sinistral across under them, and let them fall (fig. 13, *b*). She made a new selection for the dextral triplet by dropping the right hand raised element as the new lower element and counting off the three dextrals to the left, which necessitated

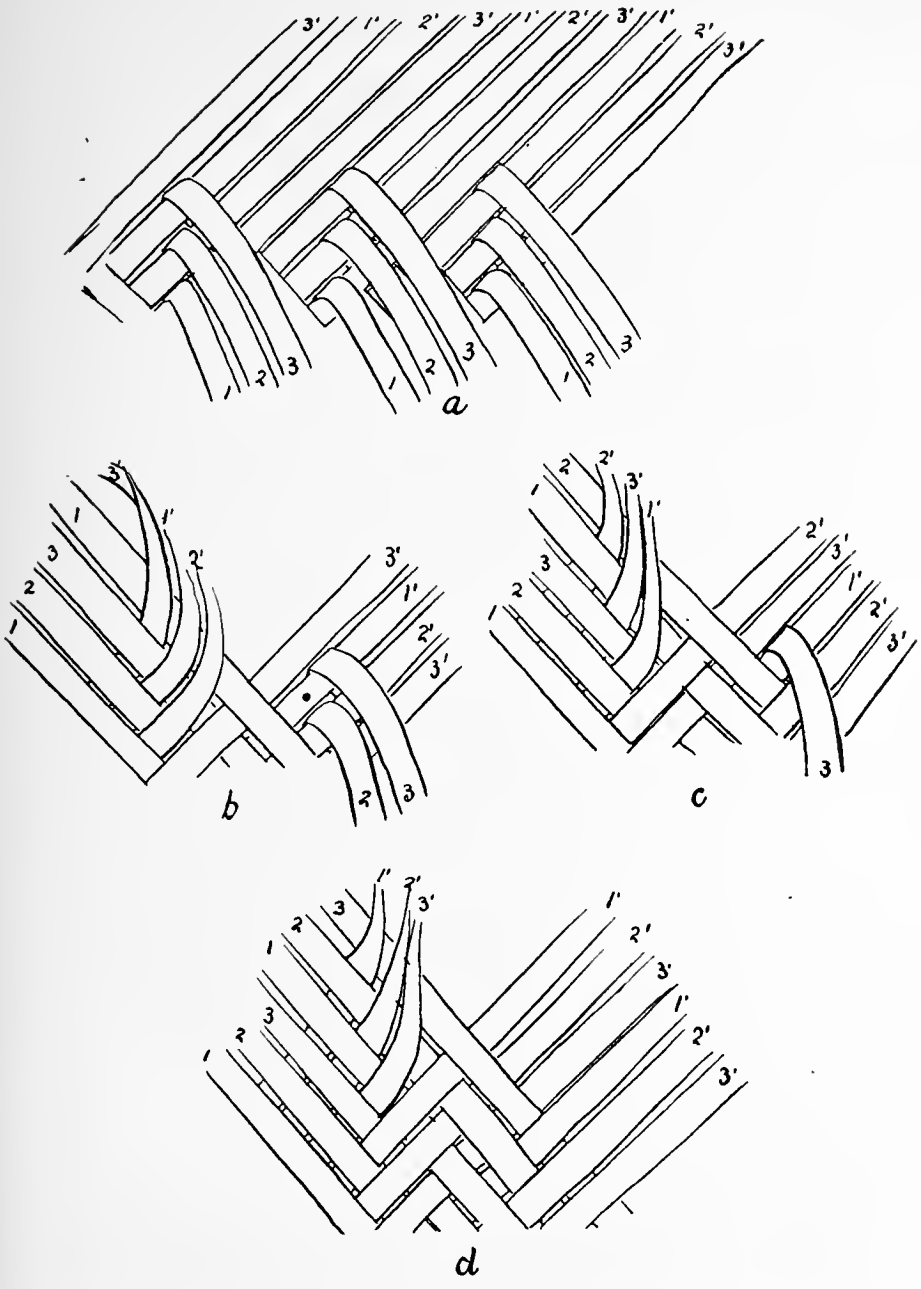


FIGURE 13.—Drawing illustrating *raraa* stroke of the *ara iri* of twilled-threes: *a*, pull back the sinistral elements, 1, 2, 3, etc.; *b*, select three dextrals, 1′, 2′, 3′, drop 3′ as lower element (to lie under crossing element), complete dextral triplet of raised elements (crossing on top) by adding 3′ to left, and pass sinistral 1 over 3′ and under 2′, 1′, 3′; *c*, drop dextral 2′ as new lower element, raise 1′, 3′, 2′ to left, pass sinistral 2 across over 3′, 2′ and under 1′, 3′, 2′; *d*, drop dextral 1′, raise 3′, 2′ and 1′ to left as new upper element, pass sinistral 3 across over 3′, 2′, 1′ and under 3′, 2′, 1′ of set to left.

picking up a new left hand member for the triplet (fig. 13, *c*). When the second sinistral had been let fall across the lower element and under the three raised elements, she followed the same plan in selecting a new dextral triplet to work with the third sinistral (fig. 13, *d*). Thus she completed a unit of the twilled-threes and moved to the right to start a new unit with the next three sinistrals and the three dextrals lying under them, proceeding exactly as before.

Three rows of twilled-threes the old woman made in this fashion, returning always to the left end to begin the row, and then she entered upon that stage of the manufacture known as the *faaoti* or closing of the mat.

Bending the *taviri* edge into circular form, she fastened the ends together by tying together temporarily the two pairs of triplets of elements left unworked at either end of the *iaau*. Having secured the cylindrical form in this way sufficiently to allow her to work on it, she fastened the ends together permanently by threading (*oomo*) the three initial sinistrals left for this purpose on the left end through the *taviri* twist at the right end, and similarly the pendant fibers of the rib left on the right end, through the *taviri* twist of the left end, and tied these together inside. Thus she joined the basket (*tuati i te ete*). Untying the two pairs of triplets from either end, she worked these together in the same stroke which before prepared the way for the twilled-threes, and then in the twilled units for three rows, continuing the stroke to right and left, so as to join the mat in a continuous cylindrical surface to an even depth all around. From now on, she continued making the twilled-three units around the circle of the basket until she attained the basket depth desired, for this basket, about 10 inches.

Ready now to convert the basket into its final oval-mouthed, envelope shape, she pressed the stout ribbed edge into the form of an oval and began to close the bottom from end to end. She employed three strokes in succession, calling them the *taviri,* the *haune,* and the *firi.* The *taviri* stroke simply put a finish on the uncompleted strokes of twilled-threes and put the elements in order for the actual closing stroke, or *haune.*

Working around the oval from left to right, the old woman bound in the sinistrals, each with a crossing dextral. Three times she moved around the oval, each time crossing one of each triplet of sinistrals with one from each triplet of dextrals. On the first round, she lifted each left-hand member of the dextral triplets in turn and dropped the first crossing sinistral under it (fig. 14, *a*). On the second round, it was the second or middle dextral of each triplet which she lifted and let fall over the second or middle sinistral (fig. 14, *b*); and on the third round, she handled the remaining dextral and sinistral of each triplet in similar fashion (fig. 14, *c*).

As a final preparation for the *haune,* she gathered up all the sinistrals and tied them in groups to keep them out of her way for the time being, for it was only the dextrals crossing one another from the two sides of the basket as she pressed it into shape, which she interwove in the *haune* stroke.

The second stroke, *haunc*, for which the *taviri* was but a preparation, actually closed the basket along the bottom.

Resting it on its rim, which she pressed into oval form, and working away from her, the old woman began to draw together the sides in a straight line following the long axis of the oval. Manipulating the elements left untied, those from the right side acting as sinistrals as they crossed the dextrals from the left side, she plaited them together in a line of checkerwork. Starting with two sinistrals and two dextrals properly crossed (fig. 15, *a*), she maintained this number of working elements throughout by alternately dropping out and picking up an element from either side, thus making a kind of four-ply plait (fig. 15, *b*, *c*, *d*).

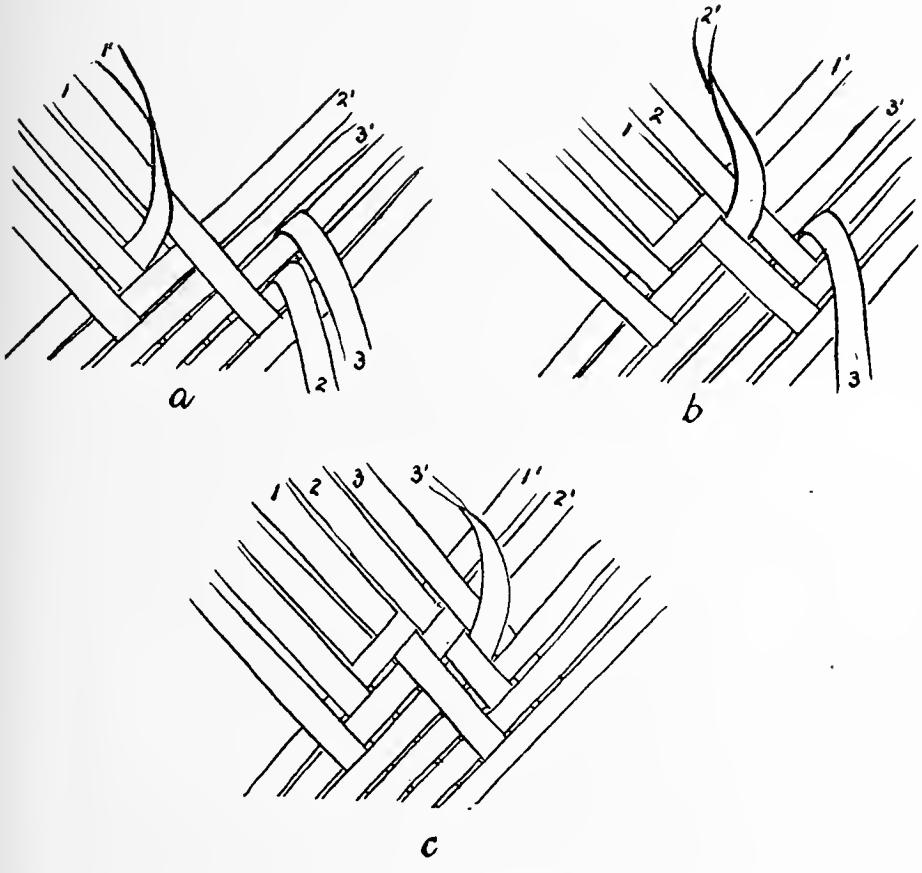


FIGURE 14.—Drawing illustrating preparatory *taviri* stroke in closing the *ara iri* of twilled-threes: *a*, on first round, lift dextrals numbered 1′ in turn and pass sinistrals numbered 1 under each respectively; *b*, on second round of work, lift dextrals numbered 2′ in turn and pass sinistrals numbered 2 under each respectively; *c*, on third round, lift dextrals numbered 3′ in turn and pass sinistrals numbered 3 under each respectively.

When she had thus bound in all the elements from both sides, with the exception of those tied out of the way, she knotted the last two elements together to hold the work, while she went back over it again and again to tighten it in the process known as *e umu*. This consisted in pulling evenly on the ends of the elements hanging on either side of the checkerwork. She handled a few at a time in either hand from the opposite sides, pulling them out gently but firmly and moving along in order from one end of the line to the other. Several times she repeated this,

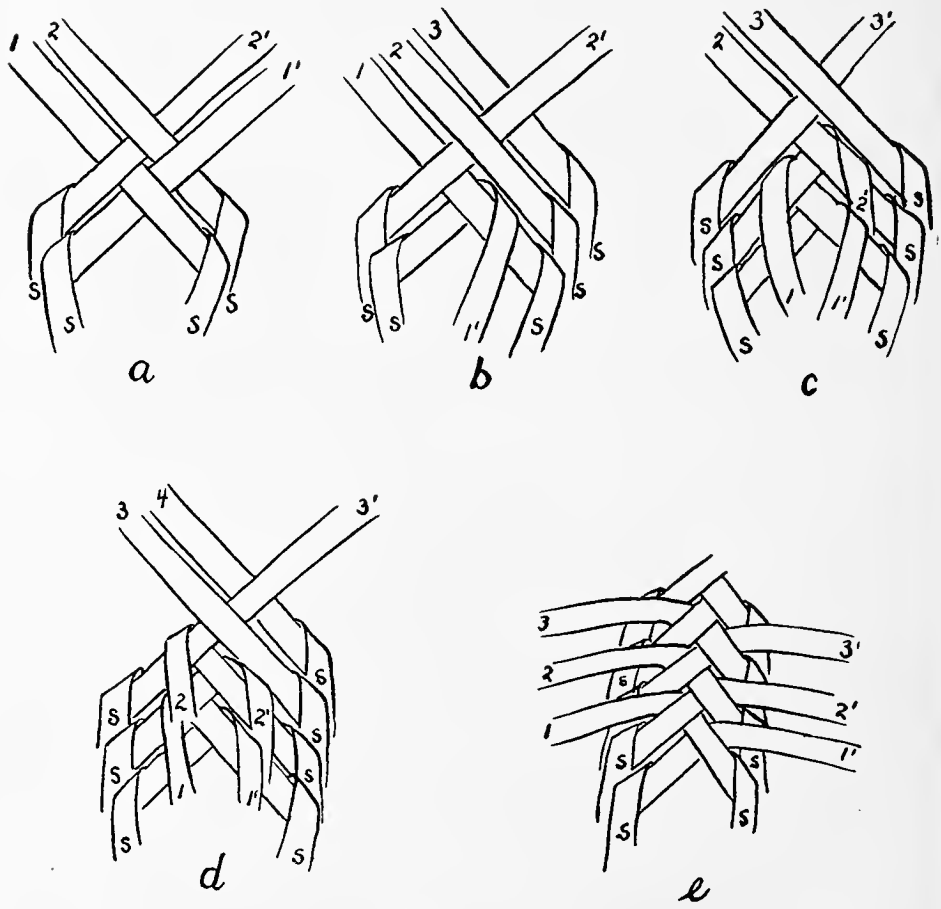


FIGURE 15.—Drawing showing *haune* stroke of closing the *ara iri* of twilled threes: *a*, pull back all sinistrals (S) and tie them out of way, preparatory to crossing dextrals from opposite sides of basket in the checker stroke, cross 1 over 1′, under 2′, cross 2 under 1′, over 2′; *b*, drop out 1′ alongside S, cross 3 under 2′; *c*, drop out 1 alongside S, cross 3′ over 2 and under 3, drop 2′ out alongside S; *d*, cross 4 under 3′, drop 2 out alongside S; *e*, tighten checkerwork by pulling on 1, 1′, 2, 2′, 3, 3′, etc.

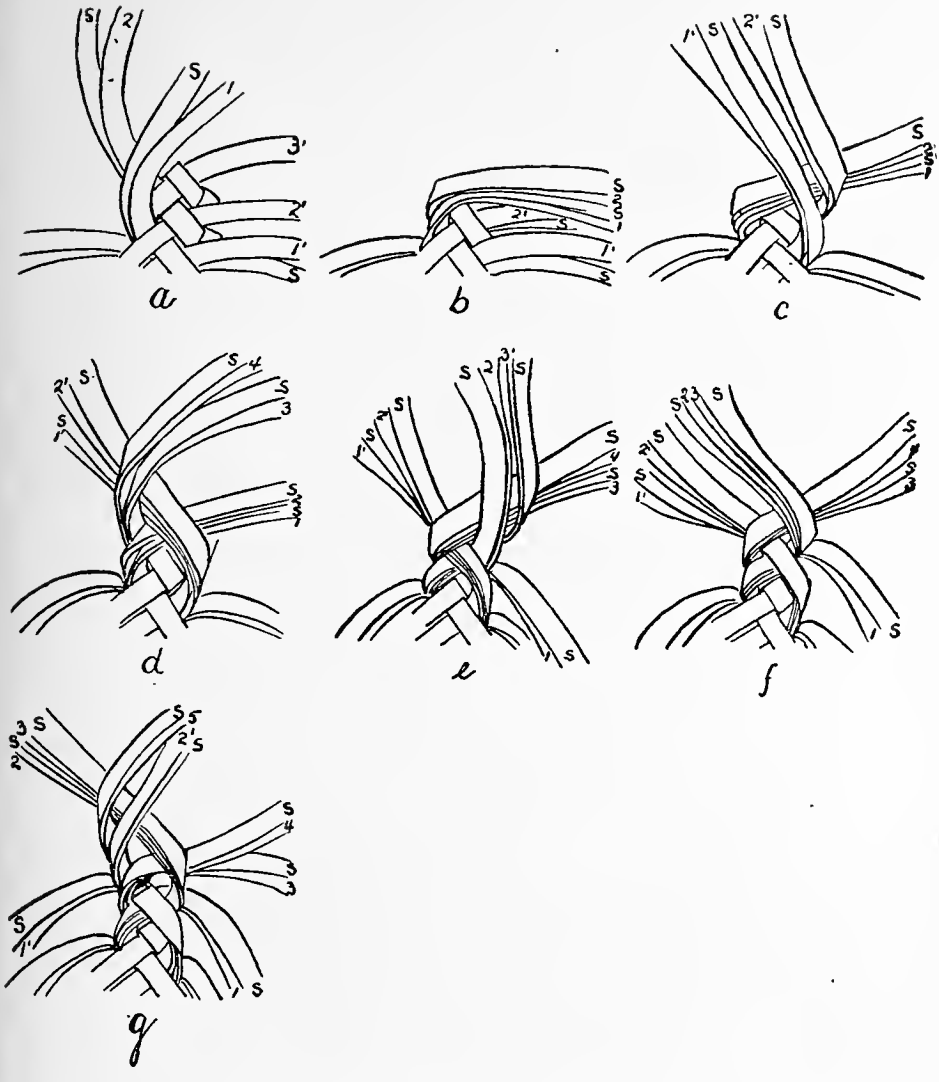


FIGURE 16.—Drawing illustrating *firi* stroke of closing of the *ara iri* of twilled threes, in which all elements are gathered into three-ply plait: *a*, gather together 1 and its adjacent S as pair, pull S and 2 around under it so that S and 2 fall on top when ply is crossed over to opposite side; *b*, cross 1, S, 2, S to opposite side; *c*, gather 1′ and S, and 2′ and S into pairs, laying the 2′ and S back of 1′ and S; *d*, cross 1′, S, 2′, S to left, 2′, and S on top, gather 3, S, 4, S together and cross over to right; *e*, drop lower pair 1, S out, replace it with 3′, S added to pair 2, S in usual fashion; *f*, cross S, 2, 3, S over to left; *g*, drop lower pair 1′, S out, replace it by adding 5, S to 2′, S, former on top when it crosses to the right.

until the strip of checkerwork was narrowed and tightened to its closest possible pattern (fig. 15, *e*).

In order to reinforce this bottom of the basket, which had now assumed the envelope shape with an oval mouth, and to bind in the elements left tied from a previous stage of manufacture, she next employed the *firi* stroke. This final stroke, sometimes also called *taviri,* is the ordinary three-ply plait worked in the following manner:

Untying the elements tied out of the way after the first stage of the closing of the basket, she spread out all of the hanging ends and it became apparent that they fell together in pairs, each element just worked in the checker stroke lying alongside an element which had been tied, the two emerging from opposite sides of the same mesh (fig. 15, *e*). From then on, she treated each of these pairs as a single element, always working the two members of such a pair together. As soon as she had started the work with two or three strokes of a three-ply plait whose elements were gathered roughly from either side, she ordered her procedure to two of these pairs, that is, four elements to a ply, by dropping out all the unnecessary ones which she had gathered up in the start. She chose her pairs in the following fashion. Retaining one pair on the left already bound into the starting plait, she picked up the adjacent pair on the left side (fig. 16, *a*), adding it to the pair already held on the outside, so that, when she folded this ply of two pairs across to the opposite side in the usual stroke of the three-ply plait, the new pair fell on top of the old (fig. 16, *b*). Similarly on the right side of the basket, she retained only the last pair of the second ply of the plait and added to it on the outside the next pair adjacent on the right side, so that it fell on top as the new ply was crossed to the opposite side (fig. 16, *c*). In like manner she reduced the third ply of the starting plait to the four elements or two pairs (fig. 16, *d*). Thereafter she continued the plait, changing the individual elements in each ply after its stroke had been completed, by dropping out the lower pair of elements and adding the adjacent pair as the top of the newly constituted ply (fig. 16, *e, f, g*). The result was that each pair acted as the top member of a ply in one stroke and was so bound in by another crossing ply, and then turned about, when again called into play, to act as the bottom member of a ply and be bound in again by a crossing ply before being dropped out of the plait.

When my old friend had progressed in this fashion from end to end of the bottom of the basket, she continued to plait the elements which remained in her hands, so that the basket had a little plaited tail at one end. This she threaded into the mesh and knotted on the inside of the basket. This is not the finish of all *ara iri;* some workers carry the small plait up the outside of the basket's end and tie it around the rim; others, matching this end plait with another at the other end made of the last elements bound into the *haune* stroke. She had now only to trim off the leaflets hanging out from either side of the *taviri,* and she cut them close without danger of the tight stroke ripping. Then, with a Polynesian smile, she handed me the completed *ara iri* of twilled-threes (Pl. VI, *A*). Some workers finish the rim in smoother style than the initial *taviri* by binding it with a strip of lauhala fastened on with half hitches of purau bark cord (*anave more*) (fig. 17).

Ara iri of twilled-twos.—There is another *ara iri* basket of twilled work. Being of twilled-twos, the manufacture is based upon the manipulation of pairs instead of triplets and consequently differs in detail from that just described. This form of *ara iri* is not made with the same attitude of exacting craftsmanship, probably because it is coarser in appearance. It is a short cut to the *ara iri* form, not quite so much trouble to make, but, like other short cuts, not so desirable, neither so durable nor so pretty. The leaves are not so carefully chosen, though they are usually toughened by being dragged across a fire; and they are not stripped to such narrow widths, the ordinary measure being ½ inch, some even the full width of the leaflet, though these are always folded as in the twilled-threes form.

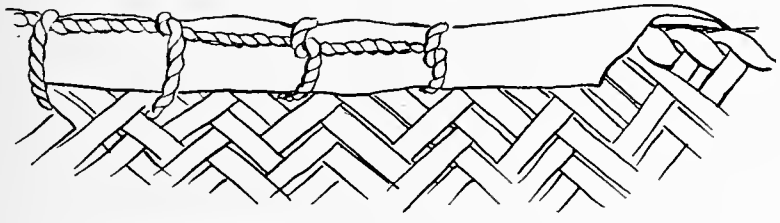


FIGURE 17.—Drawing illustrating method of binding the edge of *ara iri* with a strip of lauhala.

My old friend of Maupiti promised to teach me to make an *ara iri* of twilled-twos, but, thinking it not worth my while to see the process, she made one hurriedly and gave it to me. When she found that this would not satisfy me, she picked up a leaf that lay nearby and made one before my eyes in much the same spirit of careless abandon, with which the *oini* of checkerwork are ordinarily thrown together.

A single coconut leaf only she required for this form and this she cut to a length of about 44 inches and split down the midribs as before. The same stripping off of the edges of the folded leaflets—this time to ½ inch in width,—the same paring of the midrib with fibers left at one end followed. But, using only the two sides of a single leaf and not having two layers of dextrals and two of sinistrals to unite, she found no structural necessity for the *taviri* edge stroke of the other form. However, she used it on each *iaau* separately for the sake of its appearance as well as its durability as an edge. Working out from her from butt to tip along the midrib as before, she modified the *taviri* stroke to suit the the coming manipulation of elements in pairs, twisting but two together in each stroke. On the right hand side of the leaf, whose leaflets sprayed out across her right leg, she twisted the near leaflet to the left and around the adjacent far leaflet, pulling it tightly back to its original oblique line to the right (fig. 18, *a*). The second leaflet she twisted similarly around the third, the third around the fourth and so on. On the left hand side of the leaf she made the twist turn, of course, to the right around each leaflet in turn and back again to the original oblique line towards the left.

When the two *iaau* were ready and the last element tied to hold the *taviri* stroke, she laid the right hand side of the leaf on top of the left

hand side as before, the ribs, one on top of the other, running horizontally in front of her. The plaiting of the lower layer of dextrals and upper layer of sinistrals, which followed, was of twilled-twos. Her method was the same as in the twilled-threes, save that each hand worked two elements instead of three.

As before, she left untouched the pair of tied sinistrals at the left end and picked up the next sinistral pair in her right hand, working from left to right, and the first dextral pair in her left hand. Raising the right hand member of the dextral pair, she dropped the left hand member of the sinistral pair across under it (fig. 18, *b*). Adding to this the raised left hand member of the dextral pair, she dropped the right hand member of the sinistral pair across under the two dextrals (fig. 18, *c*). She concluded this stroke by dropping the two raised elements in her left hand (fig. 18, *d*). Choosing then the next sinistral pair and the next dextral pair to the right, she continued thus to the end of the midrib (fig. 18, *e*), where, as before, the final two dextrals were left tied together.

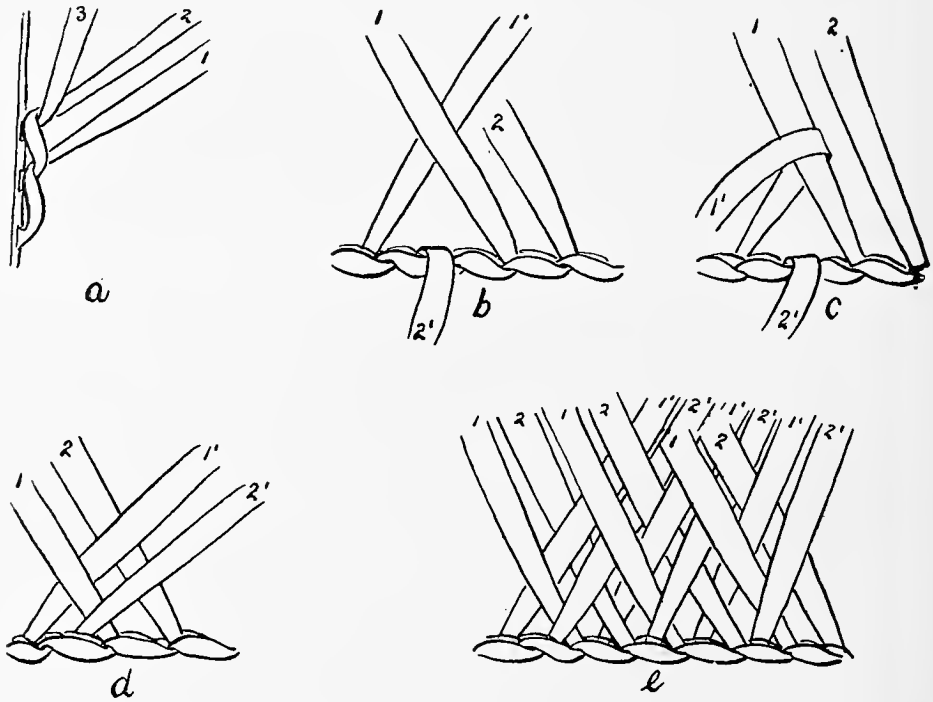


FIGURE 18.—Drawing showing strokes of the *ara iri* of twilled-twos: *a*, *taviri* edge stroke, twist 1 around 2, 2 around 3, etc.; *b-d*, preparatory stroke for twilled-twos; *b*, lift dextral 2′ and pass sinistral 1 under it and over dextral 1′; *c*, lift dextral 1′ and add it to upper element 2′ and pass sinistral 2 across; *d*, let dextrals 1′ and 2′ fall into place; *e*, continue manipulating dextrals and sinistrals thus in pairs.

She started the actual twill stroke as before, leaving this time not only the tied pair of sinistrals but also two pairs in addition, where before she had left triplets, for the closing of the basket.

Raising the fourth pair of sinistrals in her right hand, her left hand made a choice of dextrals on the principle of the twilled-threes, leaving the right hand dextral, which lay underneath the sinistral pair as a lower element to be crossed over, but raising the two dextrals adjacent to it on the left as the working pair of upper elements (fig. 19, *a*). Holding these two dextrals up in her left hand, she dropped the first sinistral across and let fall the two dextrals (fig. 19, *b*). Thereupon she new lower element and counting off the two elements to its left as the new dextral pair (fig. 19, *c*). These two dextrals she raised in her left hand as raised elements and passed the next sinistral under them, letting them fall to complete the stroke.

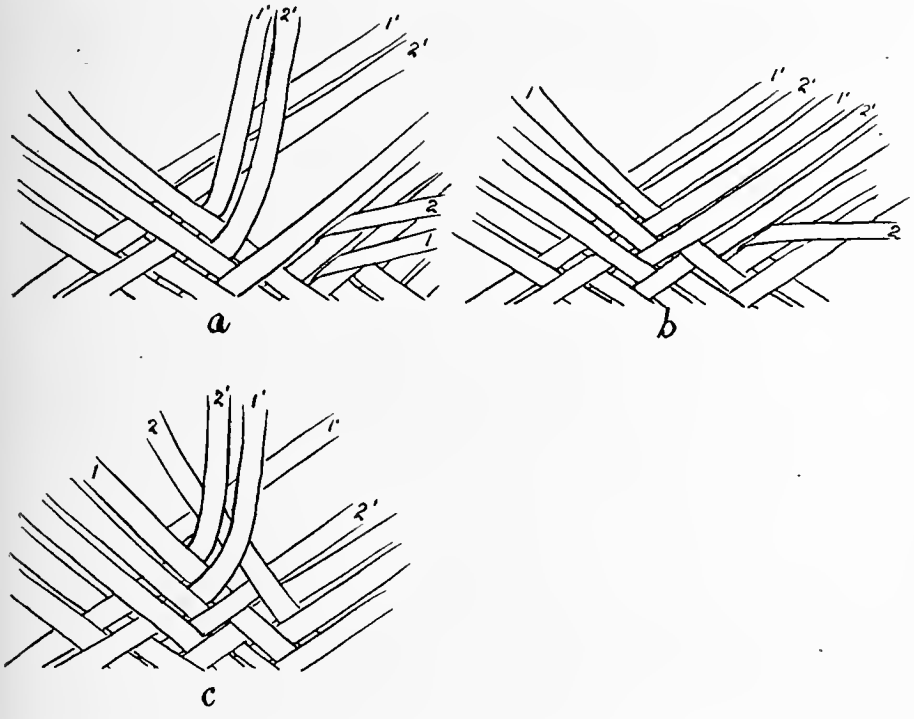


FIGURE 19.—Drawing showing stroke of vertical twilled-twos of the *ara iri*: *a*, lift dextrals 1′ and 2′; *b*, pass sinistral 1 across under them; *c*, drop dextral 2′, add dextral 2′ to left, pass sinistral 2 over 2′ and under 1′ and 2′ to left.

She then moved to the right for a new choice of elements, working now the next pair of sinistrals with two different pairs of dextrals in turn which she chose as before. After continuing this stroke to the end of the row and back again for a second row from left to right, she then tied together the ends of the ribs and closed up the mat into cylindrical form as before.

When she had completed the body of the cylinder to a depth of 9 or 10 inches, she shifted from the regular stroke of vertical twilled-twos to one of horizontal twilled-twos, it being, apparently, the convention so to do.

She made a transition by inserting one row of regular checkerwork, rapidly raising one dextral after another from left to right and dropping one sinistral under each in turn. In this manner, she transferred the dextrals from the lower or inner to the upper or outer layer of elements; and the sinistrals to the lower. The first row of the horizontal twill she worked from right to left. Where before the sinistrals were what might be called the fixed elements which passed across over or under the shifting pairs of dextrals, in this stroke the dextrals became the fixed elements and the sinistrals the changing pairs raised and lowered for the others to cross. Where before the right hand element of the moving pair was left as a lower element and two new elements to the left chosen as raised elements, now the reverse order obtained—the right hand sinistral being used as raised elements, the two sinistrals to its left as lower elements, while the first dextral was passed across over the latter and under the former (fig. 20, *a*). She then shifted one sinistral to the left, raising the former right hand lower element as the new upper element and counting off two lower elements to its left for the next dextral to cross over and under (fig. 20, *b*). She shifted them to the next pair of sinistrals and dextrals to the left and continued so for the entire row (fig. 20, *c*, *d*).

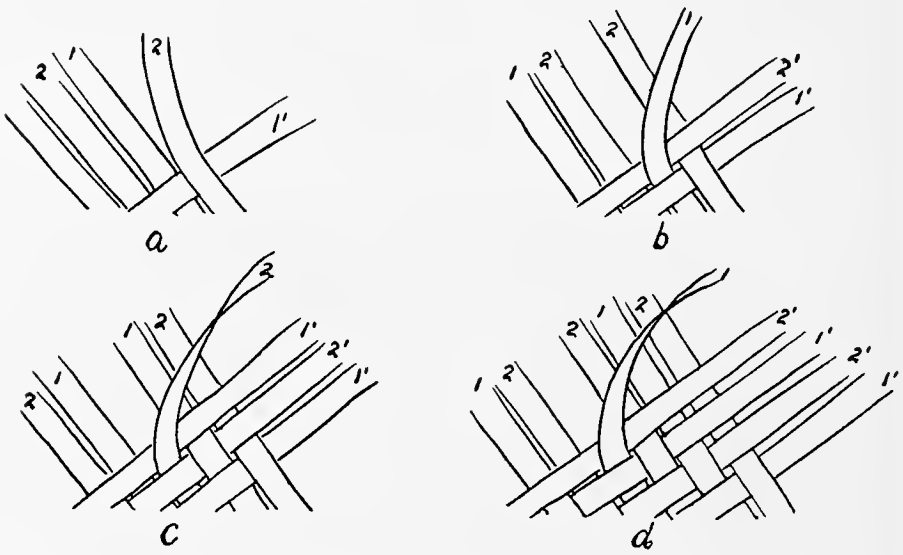


FIGURE 20.—Drawing showing stroke of horizontal twilled-twos of the *ara iri: a*, lift sinistral 2 and pass dextral 1′ over 2 of sinistral pair adjacent on left and 1 of working sinistral pair and under working sinistral 2; *b*, lift sinistral 1 of working pair and pass dextral 2′ over 1 and 2 of sinistral pair adjacent on left, under working sinistral 1 and over working sinistral 2; *c*, 1 and 2 to left becoming working sinistral pair, 1′ and 2′ to left working dextrals, lift sinistral 2 and pass dextral 1′ over sinistral 2 of pair adjacent on left and 1 of working pair and under 2 of working pair; *d*, lift sinistral 1 of working pair and pass dextral 2′ over sinistral pair 1 and 2, adjacent on left and under 1 of working sinistral pair.

The second row of horizontal twilled-twos she worked back from left to right, leaving the first two sinistrals as lower elements, lifting the third as an upper element and passing a dextral over the pair and under the one. Following these rows of horizontal twills inserted purely for ornament (Pl. VI, *B*), she closed the basket in the same manner as the *ara iri* of twilled-threes, using the *firi*, *haune*, and *taviri* strokes (p. 17, 18).

On Moorea, the people are accustomed to make small *ara iri* of broad leaflets entirely in the horizontal twilled-two stroke (Pl. VI, *C*).

TWINED WORK

It is among the paraphernalia of fishermen that the varieties of twined weaving (*papai tavai*) known to the people of these islands may be discovered. The basket forms used for traps and containers for fish, shrimps, and lobsters have been described by Handy.[4]

Haapua.—Plain twined weaving and the simplest manner of laying the foundation of such a basket characterize the manufacture of the large, round-bellied shrimp container of ieie vine, which is called *haapua* (Pl. VII, *A*). Built upon four warp elements crossed in pairs and bound together at their intersection, with the addition of single warp rootlets between them wherever needed (fig. 21, *a*), this semirigid structure swells out to a diameter of about 2 feet and, after a depth of 15 inches, narrows

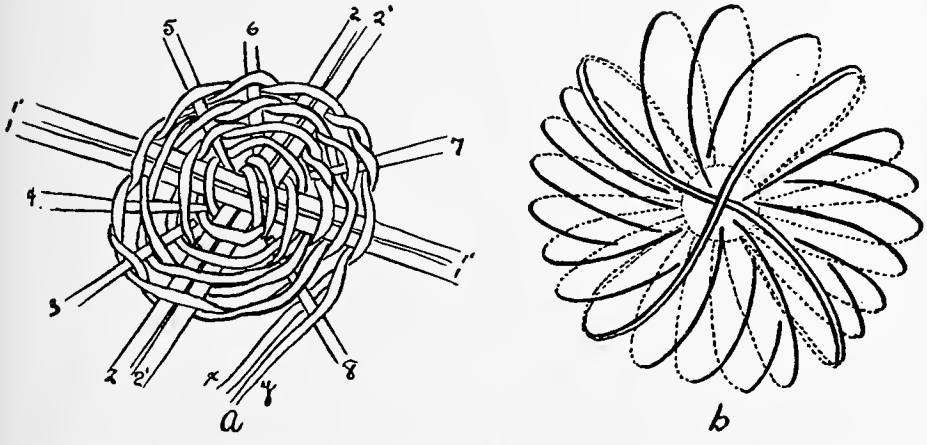


FIGURE 21.—Technique of making the *haapua: a*, cross two pairs of warp elements, 1, 1′ and 2, 2′, add single warp elements, 3, 4, 5, 6, 7, 8 where necessary, fasten them together with pair of twining wefts, x and y, spiraling out from center; *b*, diagram showing direction of warp elements, heavy lines representing them on bottom of basket, dotted lines as they turn on top and converge to mouth.

[4] Handy, E. S. C., Society Islands ethnology: B. P. Bishop Mus., in preparation.

into a mouth 8 inches in diameter. The warp rootlets radiate from the central crossing in the bottom and sweep up the sides to the mouth in parallel lines, which do not rise vertically but slant to one side with a hint of a spiral in their curve (fig. 21, *b*). The weft elements are administered in pairs, two of the rootlets being twisted together so as to include a warp at each half turn (fig. 21, *a*). A convex lid is similarly made, save that the foundation is of but two single crossing warp elements. Both the mouth of the basket and the rim of the lid are finished by binding six or more strips of split ieie vine over the rough ends of the warp elements, parallel to the final circle of wefts, and wrapping them, together with the last pair of worked wefts, with another strip of split ieie vine in an over and over stroke. By this method, a stout mouth and lid rim are obtained. The *haapua* is finished by tying on a handle of like construction, a bundle of split ieie rootlets being closely bound by a single root.

Hinai.—Unsplit ieie rootlets, and identical methods of plain twined weaving and the wrapping of the edge are employed in the shrimp trap called *hinai* (Pl. VII, *B*); but the basket form is very individual. It resembles a large bottle, is about 20 inches deep, and swells gradually from a neck 6 inches in diameter to a bulb 13 inches in diameter. Having no closed bottom, merely inturned sides which rapidly converge within the basket to an opening about 3 inches across, no foundation is laid for the *hinai* as for the *haapua*. The ends of 23 or 24 warp ieie rootlets are bound into a circle 3 inches in diameter with a pair of twined wefts, and, held in slightly diverging parallels by the crossing pair of wefts circling round and round them, are worked into a spreading cylinder about 8 or 9 inches deep. Thereupon the warp elements are turned out and up in the direction from which they came, the twining wefts following their sharp curves and continuing up them, round and round to form the sides of the basket. Spreading as far as 2 inches apart at the widest diameter, the warp elements then converge gradually until they are gathered together in pairs at the small mouth.

Tobacco basket.—When my reputation as a collector of baskets of native manufacture was established, I found, one day, tied to my door knob a small round basket of *ieie* of beautifully regular twined work. It proved afterwards to be a common type of container in which small articles could be carried or hung up inside the house, for it is equipped with a handle of twisted cord of purau bark. Constructed of smaller ieie rootlets and with diminutive dimensions (7½ inches at its greatest diameter, 5 inches deep, and 5 inches across its mouth) it is very fine in appearance (Pl. VII, *C*). Its foundation is not laid as is that of its great relative,

the *haapua,* but in a manner suggestive of the Hopi Indian type of twined weaving.[5]

Six rootlets arranged in parallel pairs are laid at right angles across the same number, similarly arranged, and held in place by a row of twined weaving circling them all (fig. 22). After ten rows or so of twined weaving about the warp pairs, these pairs are separated and inclosed singly by the turning wefts, diverging as far as an inch apart over the bowl of the basket and converging slightly towards the mouth. The mouth is wrapped as in the *haapua* and the *hinai.*

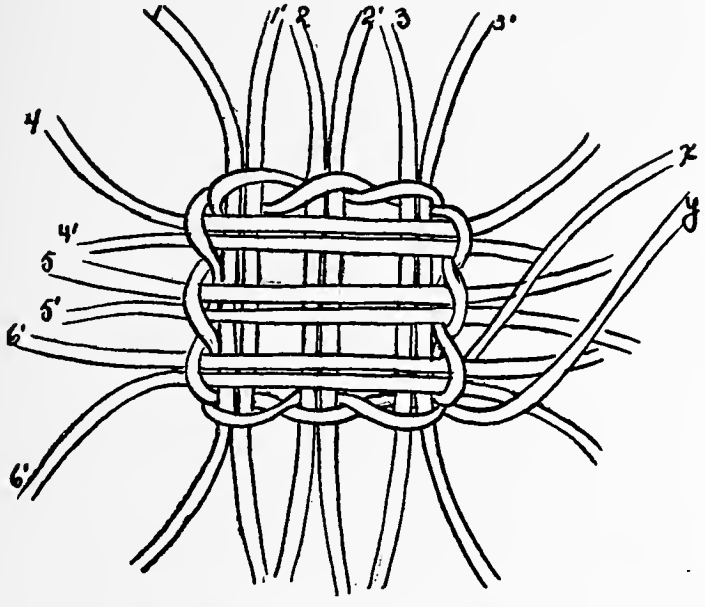


FIGURE 22.—Drawing illustrating process for foundation for small *ieie* tobacco basket: cross three horizontal pairs of warp elements 4, 4′, 5, 5′, 6, 6′ over three vertical pairs of warp elements 1, 1′, 2, 2′, 3, 3′, and bind them together with pair of twining wefts, x and y.

Tavai.—Finer than any of the twined work of *ieie* so far examined is that of the long pliable basket known as *tavai,* in which shrimps are sometimes caught (Pl. VII, *D*). Manufactured from ieie rootlets which have been split lengthwise and scraped clean, both the warp and the weft elements are flexible. Aside from this difference in the method of treating the material, which evolves a basket of no rigidity of structure, there are also a number of stages in the fabrication characteristic of the *tavai* alone. This form, which is 27 inches deep, springs from a small oblong base (7½ inches long by 1½ inches wide) and flares to an oval mouth which

[5] Kroeber, A. L., and Waterman, T. T., Source book in anthropology, p. 299, fig. 23, Berkeley, 1920.

FIGURE 23.—Technique of making the *ieie* shrimp basket, *tavai: a*, bind together seven inches of parallel warp elements with four pairs of twining wefts; *b*, bind together 1½ inches of parallel warp elements with pair of twining wefts crossing back and forth in zigzag line; *c*, superpose *b* on *a* and sew them together with strip of *icie* for bottom of basket, make sides by twining pair of wefts in a spiral about all warp elements, adding extra warps where needed; *d*, make ornamental border of two rows of crossed warps fastened by three rows of twined wefts; *e*, *f*, *g*, wrap ends of warp elements about bundle of *ieie* to form basket edge, wrap 1 and 1′ about bundle, draw 2 and 2′ up over bundle, pull 1 and 1′ across 2 and 2′ and lay them with strands of bundle, wrap 2 and 2′ about bundle so as to bind in 1 and 1′.

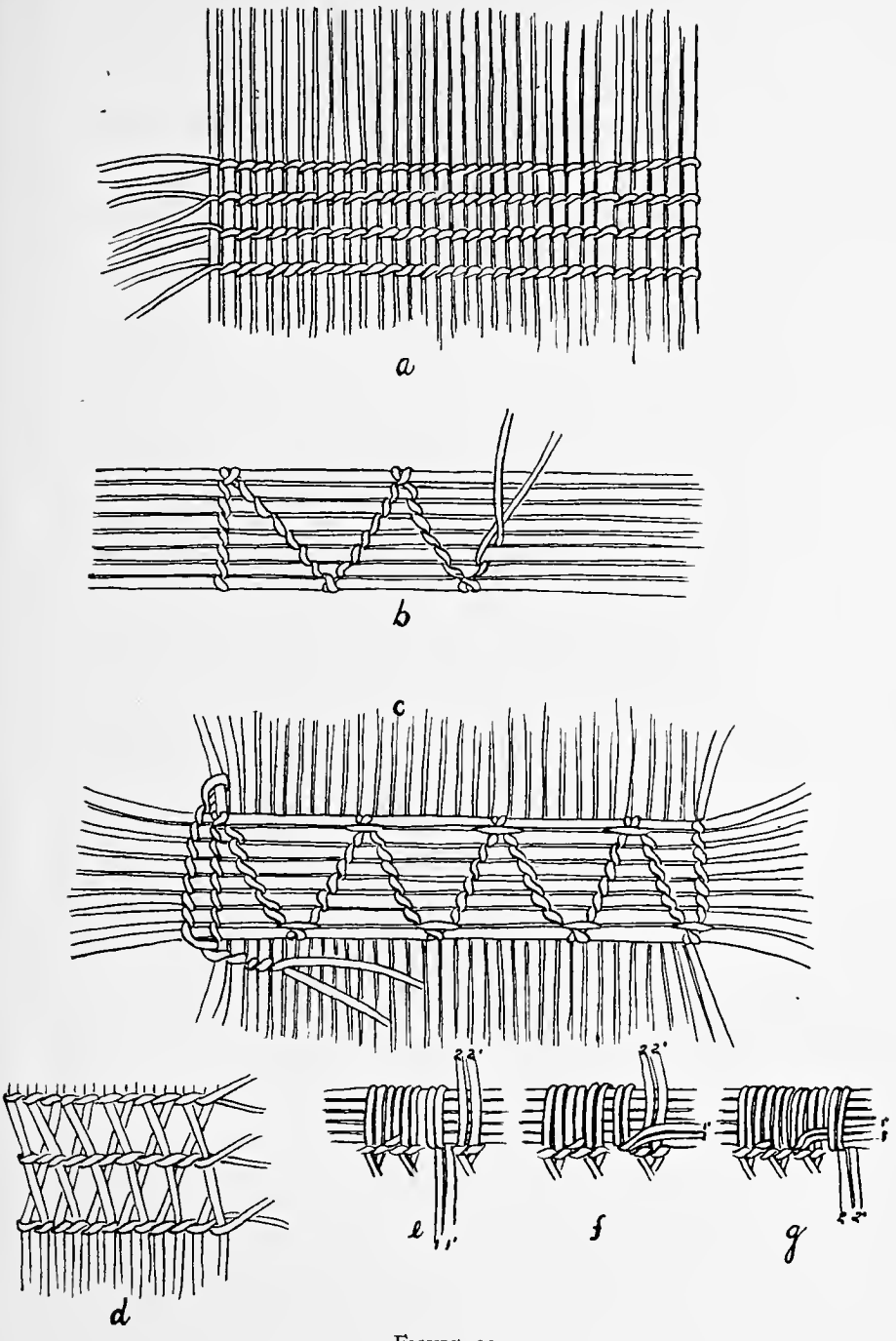


FIGURE 23

is 56 inches in circumference. Laid closely alongside one another, its parallel warp elements are bound together at intervals of an inch by a pair of twining wefts in the ordinary stroke of plain twined work.

The foundation of two layers of parallel warp rootlets crossing one another at right angles is laid in the following fashion:

Parallel warp elements, in as great lengths as possible, are fastened at their middle points by a pair of wefts twining across them, until a band 7½ inches across has been united (fig. 23, *a*). When these parallel elements, which are to form the front and back warp of the *tavai,* have been bound together by four rows of twined weaving about half an inch apart, they are laid aside until the warp elements for the ends have been prepared. Again a group of long rootlets, laid in close parallels to a width of 1½ inches, is made into a unit by a pair of twining wefts crossing and recrossing them; but this time the wefts cross not in parallel rows but follow a zigzag course from side to side, until a section 7½ inches long in the center of the warp elements is bound into a small mat (fig. 23, *b*). The end warp elements being thus made ready, they are laid across the front and back warp elements at right angles, and the two small oblong mats are stitched together by threading an *ieie* strand in and out in half inch stitches along the long edges of the mats (fig. 23, *c*).

Upon this double foundation, from all sides of which hang the warp elements, the *tavai* is built. The first row of twined wefts, which encloses the whole oblong base, follows the line of a squarish oval, but as extra warp elements are inserted at the corners of the foundation mat, the course of the twined work becomes more truly oval.

Just below the mouth of wrapped work (figs. 23, *e-g*), which binds in the ends of the warp elements, a border of two rows of crossed warp elements bound by twining wefts is inserted in all *tavai* for ornament (fig. 23, *d*). The wefts passing across between the points of intersection of the warps, so that hexagonal interstices are left in the open work, the use of this border seems to assume some importance, being identical with what is said to be a rare technique of limited distribution in America, found in southeastern Alaska and among relics in Peruvian graves.[6] I find, in the Bishop Museum, an eel basket from New Zealand, which is constructed entirely of this openwork stroke.

Satchel of ieie.—The construction of an envelope-shaped carrying satchel of split ieie rootlets introduces a variant of the *tavai* style (Pl. VII, *E*).

Instead of two bands of warp elements being woven, the one to be superposed upon the other to form a double foundation, five pairs of weft elements are twined at intervals of half an inch across the central section of the warp elements, closely placed in parallels to a width of 15 inches, to form the bottom of the basket, which in no way differs from the sides. The warp elements, hanging from either side of this small central mat, continue as the front and back warp elements of the basket; but the pairs of crossing wefts, having been worked in their central sections also,

[6] Op. cit., p. 294, fig. 11.

continue from either end of the central mat as warp elements for the ends of the basket. The weft pairs are separated and worked singly as end warps, and are supplemented by the insertion of other warp elements doubled about the end warps of the foundation mat (fig. 24, *a*).

Thereafter the basket is built up in oval form by a pair of twining wefts, which gradually spiral up, an inch higher each round until a depth of 14 inches has been obtained. The mouth is finished by a wrapping stroke (fig. 24, *b-e*).

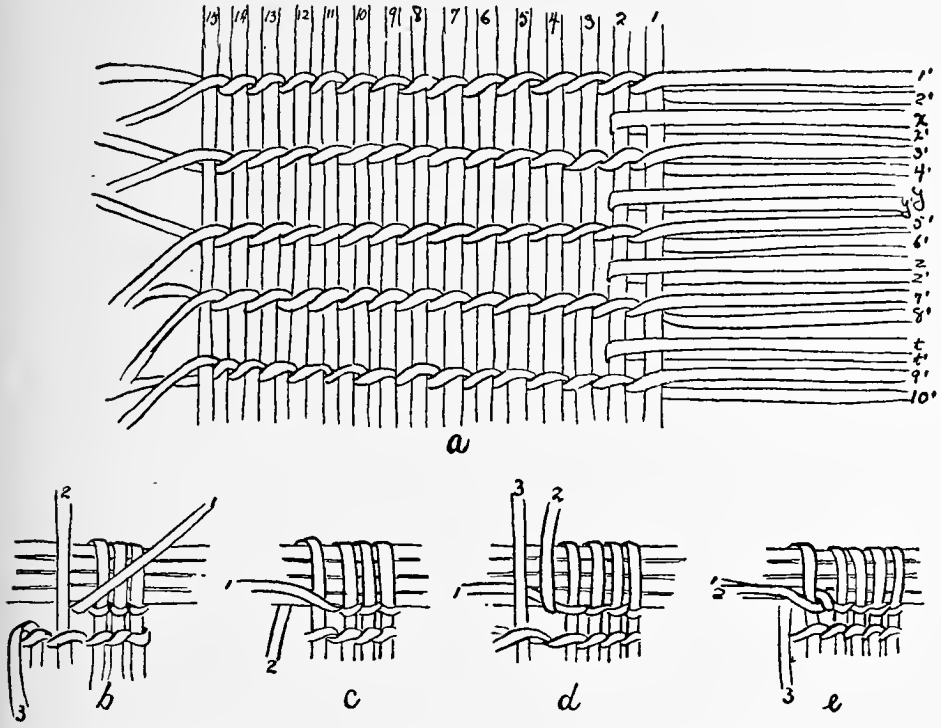


FIGURE 24.—Technique of making satchel of *ieie:* *a*, fasten 15 inches of parallel warp elements 1, 2, 3, 4, 5, etc., together with five pairs of twining wefts, 1′ and 2′, 3′ and 4′, etc., allowing ends of wefts to hang loose at sides for end warp elements, insert additional warp elements x, x′, y, y′, z, z′, etc., in ends by doubling strips of *ieie* about wraps 1 and 2; *b-e*, bind edge of basket thus: wrap 1 over and around bundle of horizontal elements, twist end of 1 to left across 2 as it is brought up over bundle, wrap end of 2 around bundle and up over end of 1, pull 3 up over bundle so as to cross over end of 1 also, twist 2 about so as to cross over 3.

Another hinai.—A kind of sieve, with which to scoop shrimps out of a stream, is made of split ieie rootlets in an odd form, which may best be described by comparison. Turned upside down, it is a replica of the roof form of the oval-ended Tahitian house (Pl. VII, *F*), front and back sloping to a ridge, ends spraying out from the ridge ends in a fan shape.

A mat 10 inches square, of 48 warp elements fastened in parallels about ⅛ inch apart by 10 pairs of twined wefts woven across in parallel rows 1 inch apart, is bent sharply in the middle, the fold running parallel to the weft elements. Thus is formed the front and the back of the *hinai* (fig. 25, *a*). The warp elements for the fan-shaped ends are developed by doubling rootlets at the proper intervals about the extreme right and left warp elements of the mat already woven (fig. 25, *b*). Five pairs of wefts are tied in and woven across the end warps, so as to join the ends of the central wefts, the end warps diverging a little more with the crossing of each pair of wefts into the fan form. When the ends of the warps have been bent parallel to the wefts and closely wrapped with a binding strand of *ieie* into an oval mouth, 15 inches in one diameter, 7½ in the other, this *hinai* is complete.

Other twined strokes.—The strokes of twined work used in the manufacture of the cigar-shaped fish basket, *haapua ia,* some made of bamboo (Pl. VIII, *A*), some of the stems of the aanuhe fern (*Gleichenia dicho-*

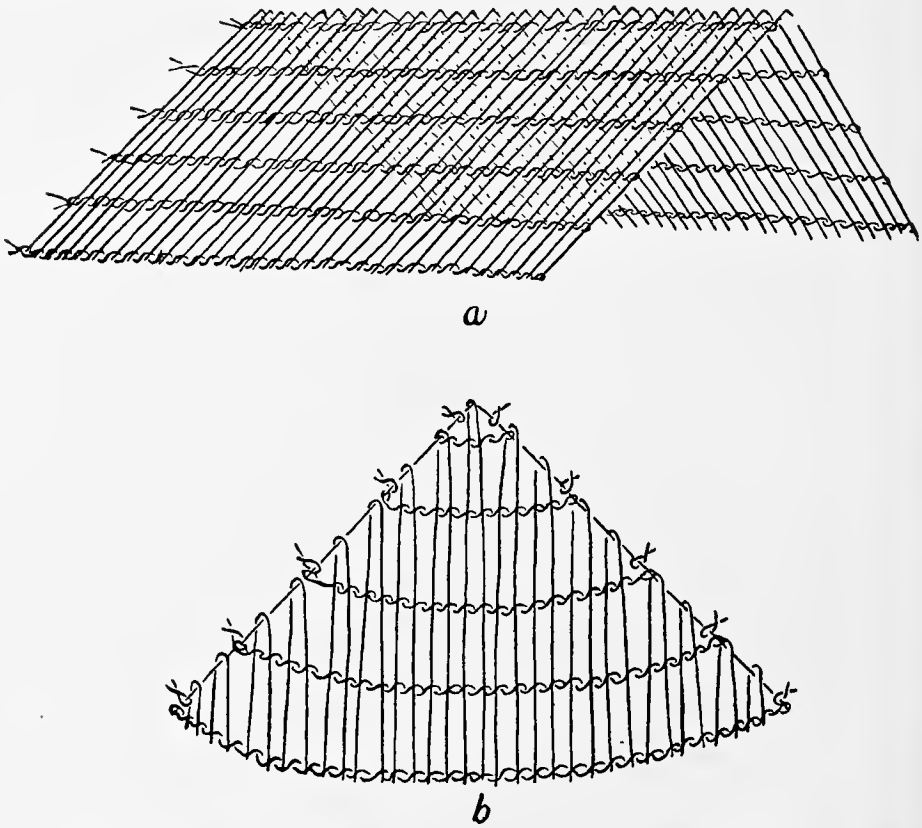


FIGURE 25.—Technique of making the *ieie* sieve for catching shrimps: *a*, diagram of method of binding ten inches of parallel warp elements together by ten pairs of twining wefts and bending warps in middle; *b*, diagram of method of making fan-shaped ends, creating warp elements by doubling *ieie* about end warps of *a* and binding warps together with five pairs of twining wefts.

toma) (Pl. VIII, *B*) are of an interesting variety. In some the rigid warp elements of bamboo are bound side by side by pairs of weft elements of inner purau bark worked across with the usual stroke of plain twined weaving (fig. 26, *a*). Some are bound together with a single weft of the twisted purau bark cord in the fashion of wrapped weaving (fig. 26, *b*). At the edges of the small door of this container, the binding strokes are of tied twined weaving (fig. 26, *c*), the members of a pair of wefts being tied together after encircling each warp element. The bamboo warps are bound to the rigid horizontal hoops of guava wood after the manner of

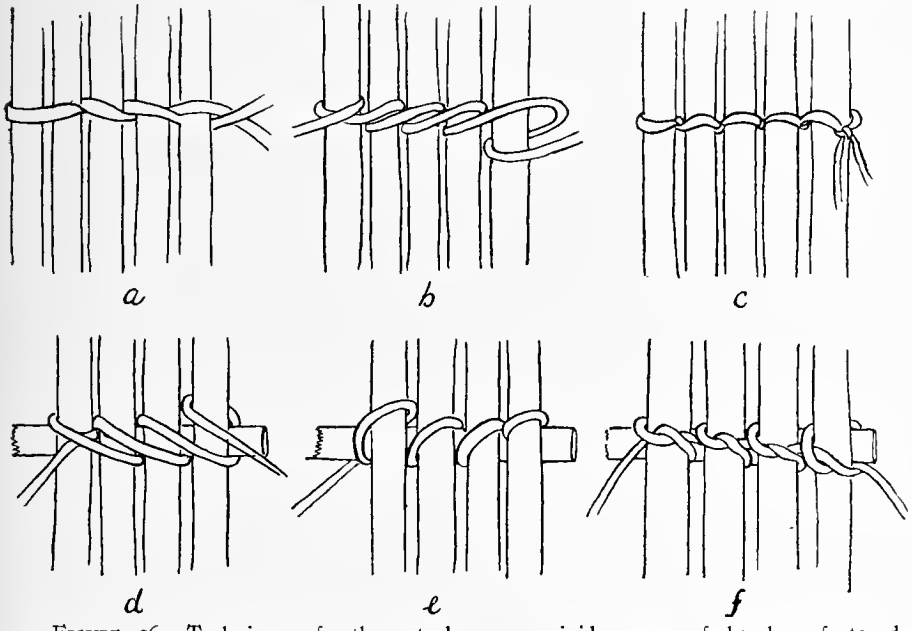


FIGURE 26.—Technique of other strokes: *a*, rigid warps of bamboo fastened together by pair of twining wefts of pliable *more; b*, rigid warps of bamboo bound by single crossing pliable weft of *more* after fashion of wrapped weaving; *c*, rigid bamboo warps crossed by pair of pliable twining wefts of *more*, which are tied together at each stroke; *d*, outside view of rigid bamboo warps bound to rigid transverse element by pliable weft of *more* after fashion of wrapped weaving; *e*, inside view of *d; f*, rigid bamboo warps bound to rigid transverse element by pliable weft of *more* which is tied at every stroke.

wrapped twined weaving, wherein the guava stick crossing the bamboo warp on the inside like a lattice is regarded as one member of the twining pair of wefts, the bark cord is the binding element which is wrapped around the crossings of the horizontal element with the vertical warp (fig. 26, *d, e*). Where special strength is desired, the binding element of the wrapped weaving is also tied about itself to conclude each stroke (fig. 26, *f*).

Similarly, the great lobster baskets of Maupiti (Pl. VIII, *C*) employ several strokes, plain twined weaving to bind together the stems of aanuhe fern at the ends of the basket, wrapped twined weaving to fasten the fern stems to the guava ribs.

There is a coconut leaf basket, which is constructed upon the principle of tied weaving of openwork. Two styles of this form of *haapee* may be distinguished, the first a simple relative of the more elaborate one of tied openwork, but illustrating the development of the basket from its simplest form. Each style is constructed of a single, whole coconut leaf, only the spreading butt and the tip of the midrib being cut off. In Hitiaa, one of the Te Aha Roa districts on Tahiti, the simplest form is made. The midrib is slightly cut in two places, about 3 inches on either side of the middle point of its length, so that it may be bent at these points to form a U shape. The 6 inch central section forms the bottom rib of the basket, and the two long sections are bent up to form the sides of a deep, sack-like receptacle.

FIGURE 27.—Drawing illustrating simplest form of *haapee* constructed of single whole coconut leaf.

For purposes of description, it may be said that the completed U-shaped pouch is to have four ribs, the side ones formed by the midrib of the leaf, the front and back ones formed by rolling together the ends of the leaflets into a twist where they cross. The front of the pouch is made of the leaflets growing on the left of the midrib, gathered together in pairs alternately from either side of the pouch, beginning at the center of the bottom rib, and twisted into a tight roll up the center of the front. The back of the pouch is similarly made of the leaflets growing on the right side of the midrib. When the last pairs have been twisted in, that is a pair from the butt and a pair from the tip, on the front side of the pouch, the ends

of the leaflets are bound into a three-ply plait, which is knotted to a similar plait of the back leaflets to form a handle for the pouch. (See fig. 27.)

On Raiatea, this type of *haapee* (called there *ufara*) is more painstakingly made and some are elaborately reinforced with strips of purau bark. About 78 inches of a large coconut leaf are used, the butt and the tip being cut off. This is divided into thirds by shallow cuts and bent into a U of three equal sides. The gathering of the pairs of leaflets from the sides to form the front and the back of the pouch proceeds as in the case of the simpler *haapee*, save that they are bound into a three-ply plait instead of a roll up the front and the back. (See fig. 28, *a*.) The result is a large, flat envelope, square save as the plaiting draws the sides slightly together at the mouth, with a stout plaited handle formed of the ends of the leaflets. For reinforcement, a long thong of purau bark is tied at intervals of 6 or 8 inches with half hitches around the plait from the jointure of the handle, down the front and up the back of the basket to be knotted firmly on the handle. The mouth of the basket is similarly strengthened by binding the top pairs of leaflets with a string of purau bark tied around with half hitches at intervals. The leaflets of the body of the basket are now worked into a kind of coarse net of large, triangular mesh by a method which may best be called tied weaving.

Working from left to right, first on one side of the plait, then on the other, the pairs of leaflets as they hang out of the plait or grow on the midrib are handled as double, flexible warp elements, through which single wefts of purau bark are woven at three inch intervals. Each weft is tied about a double warp—a pair of leaflets—at every stroke, the composition of which is continually changing. The first weft separates the members of each pair of warp leaflets, catching the left half of each with the right half of the preceding pair and the right half with the left half of the succeeding pair; the second weft unites the original pairs of warp elements again; and the third separates them as before (fig. 28, *b*). The result is a triangular mesh, with warp elements running in a diagonal zigzag (Pl. III, *D*).

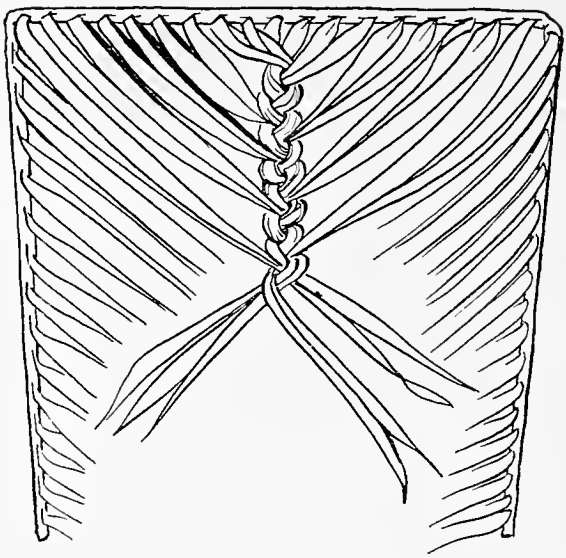
(See also an example of twined open work from the Aleutian Islands.[7])

Matting

Bamboo matting

The coarsest mats, which serve both for walls and floors of many houses, are constructed of heavy flats of bamboo beaten partially to shreds. The checkerwork which characterizes them is not of the diagonal variety, but worked of horizontal and vertical elements. When a mat of sufficient

[7] Op. cit., p. 293, fig. 10.



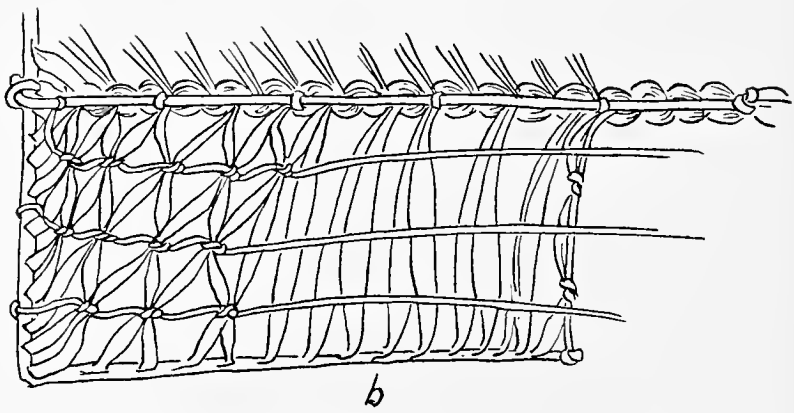


FIGURE 28.—Technique of making *ufara* of whole coconut leaf; *a*, bend midrib into thirds and gather leaflets, first on one side of midrib, then on other, by pairs into three-ply plait up center of each side; *b*, cross pairs of warp leaflets with single wefts of purau bark after manner of tied weaving, separating and uniting pairs of warps so as to form diagonal, triangular mesh.

size for a wall or the floor of a house has been so woven on the ground, it is rolled into a large cylinder, pith inside, and tied with a strip of purau bark (Pl. IX, *A*). Left thus in the sun, it is thoroughly dried before being placed in position in the house (Pl. IX, *B*).

COCONUT LEAF MATS

The simplest mat form evolved from coconut leaves is the *niau,* which is used for thatch. Constructed of almost the full length of a split midrib with its adhering leaflets, a *niau* calls into play the art of the plaiter only to the extent of making a pattern of diagonal checkerwork to a depth of about 15 inches. Not even a finishing stroke is added, the ends of the leaflets being left hanging. These simple thatch units are spread upon the ground for a thorough drying before being used (Pl. X, *A*).

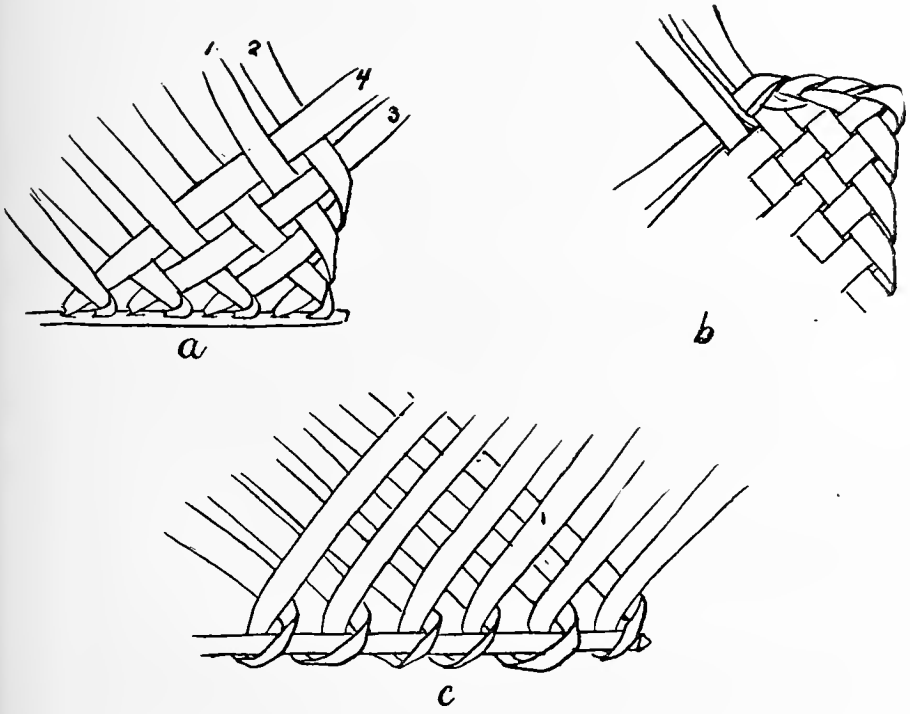


FIGURE 29.—Technique of making coconut leaf mats: *a,* method of folding ends of *paua,* transform dextral 1 into sinistral by folding it towards worker and crossing it in checker stroke over dextral 2, under 3, over 4, etc., transform 2 into sinistral by folding it towards worker and crossing it over 3, under 4, etc.; *b,* method of finishing long edge of *paua* in three-ply plait; *c,* method of turning leaflets on right side of midrib around rib to act as sinistrals on left side of midrib in *paua tarii.*

Coconut leaf mats primarily designed for making the walls of a house, though sometimes used as seats on the ground, are called *paua.* These mats, though all made of sections of whole unsplit midribs with the leaflets adhering to both sides, are of two types. In some, the leaflets of each side are plaited together separately in diagonal checkerwork, so that a narrow mat lies along each side of the midrib (Pl. X, *B*). A neat edge is put upon the ends of such twin mats by folding the dextrals on the right edge back into the checkerwork and plaiting them in as sinistrals (fig. 29, *a*); and contrariwise, the sinistrals on the left edge, as dextrals. Furthermore, each mat is finished by a three-ply plait at its outer edge, which gathers up the pendant leaflets there (fig. 29, *b*).

The other form of *paua,* called *paua tarii,* is primarily designed to be flung upon the ground as a seat; and so, while the whole midrib is used, it does not occupy an uncomfortable position down the center of the mat, but is made one of the edges by plaiting the leaflets from both sides together into a single mat. Every effort is made to minimize the disadvantage of the hard rib and to make the mat lie flat. The cross section of a coconut midrib being somewhat triangular in shape, this mat is woven with the flat or base of the triangle uppermost and the sharp edge down.

Instead of folding the leaf in the middle and creating a bulge at one edge, where the stiff butts of the leaflets are gathered together from either side of the midrib, the leaf is laid on the lap with the flat of the rib up, a set of dextral leaflets running away from the worker and a set running towards her. It is only the near leaflets which the worker folds about to the other side and this she accomplishes by twisting them over the midrib and passing them under the dextrals which run away from her, as sinistrals (fig. 20, *c*). This *taviri* stroke holds the midrib flat and also pads it with a layer of leaflets.

During the plaiting of a *paua tarii,* the leaflets are kept folded along their small midribs, so that the mat is rendered more durable by the use of doubled elements.

A young woman on Maupiti made a very fancy *paua tarii* for me.

She used three rows of diagonal checkerwork, then a row of horizontal twilled-threes, a row of horizontal twilled-twos, another row of horizontal twilled-threes, and two rows of the regular diagonal checkerwork again. She worked an edge on the ends as in the common *paua* and finished the side parallel to the rib by gathering the leaflet ends into a three-ply plait (Pl. X, *C*).

LAUHALA MATS

Plain in appearance as are the large floor mats of lauhala, still made by the women of Maupiti, they nevertheless involve an exacting technique in manufacture, which seems to approach a step nearer to weaving than the diagonal checkerwork. No loom is used, of course, but, as soon as the

main body of the work is started, it is laid on the floor with the elements running vertically (*hua* or *fenu aano*) and transversely (*hua* or *fenu taravа*) in front of the worker. The vertical elements act practically as warp elements. Though there is no heddle to separate them as each transverse element, acting as a weft, is laid across, the hands really "shed" them, pressing alternate ones forward or towards the worker (*haere i nia,* come up), and the others backward or down away from the worker (*tuu i raro,* bring down). A regular checkerwork, each transverse element crossing over or under but one vertical at a time, is thus fabricated and held together with binding strokes on either edge.

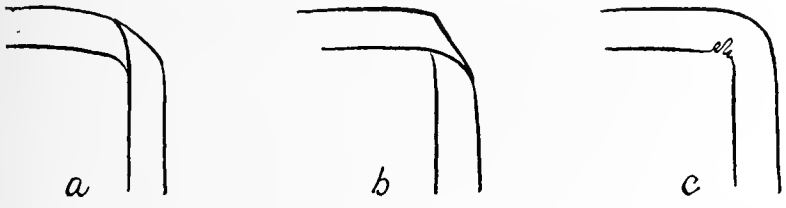


FIGURE 30.—Processes of turning an element at right angles: *a, o fati,* fold it away from worker; *b, e huri,* fold it towards worker; *c, noanoa,* twist it about, same side up.

The general term, *haune,* is applied to this technique of matmaking; *raraa,* also, though less correctly, I believe. As in basketry, the individual elements are *fenu,* by some called *hua* or *noai.* The elements may be folded (*ea*) in several ways: away from the worker, the stroke being called *o fati* (fig. 30, *a*); towards the worker, *e huri* (fig. 30, *b*); when twisted or pulled around at right angles so that the right side continues uppermost, *noanoa* (fig. 30, *c*).

Taviri.—A general term covering all twisting processes. An edge is designated as *hiti*: *hiti aano,* for the edges of the length; *hiti fatu,* for the foundation edge, which sets the width of the mat; and *hiti taviri,* for its opposite, the final edge made. A *peho* is a corner, as in basketry.

Peue.—Lauhala mats, called *peue,* range in size from 5½ feet by 8 feet to 15½ feet by 20 feet. Ellis describes seeing *peue pae ore* (lauhala floor mats) of extraordinary size, the lengths running to 60, 80, even 100 yards,[8] such mats, however, being more for display than for actual use. The elements are from 5/16 inch to ⅜ inch wide. Owing to the fact that the work is started at one corner and proceeds in vertical and horizontal lines across the point, the elements, when the work is complete, run

[8]Ellis, William, Polynesian researches, 2nd ed., vol. 1, pp. 187-88, London, 1831.

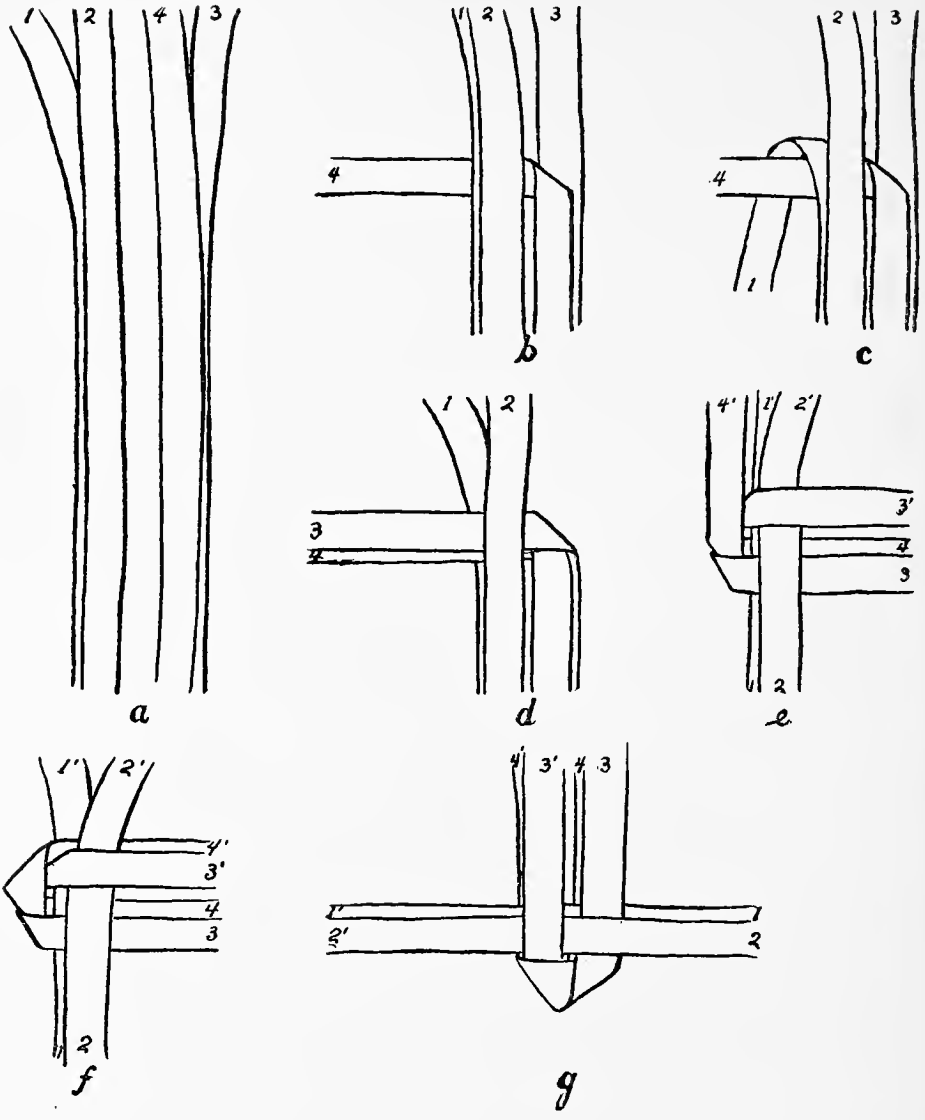


FIGURE 31.—Technique of making of *peue*—the foundation corner: *a*, place 2 on 1, 4 on 3 and arrange pairs of elements parallel to each other; *b*, fold 4 away from worker and pass it under 1 and 2; *c*, separate pair 1 and 2; *d*, fold 3 towards worker, pass it between 1 and 2 and lay it on top of 4; *e*, turn work around to manipulate other ends of elements, fold 3′ towards worker and pass it over 1′ and 2′; *f*, separate pair 1′ and 2′, fold 4′ away from worker, pass it between 1′ and 2′ and lay it underneath 3′; *g*, complete first corner.

obliquely across the rectangular mat (Pl. XI, *A*). A *peue* is finished with an inch wide double border which is apparent only on the wrong side.

I think that the only reason I found an old woman willing to make the very real expenditure of effort and time necessary to teach me to make a *peue* was because she had always wanted to know an American and felt she could not miss this opportunity. I can only hope that she received as much information during the days we spent together as I did. It was she who initiated me into the process of stripping the prepared lauhala to the right width (p. 35). When she had made ready a great bundle of stripped ribbons in that fashion, she swept her floor clean and we sat down to the business of mat-making.

The first stage in the manufacture she called the *fatu* or foundation and it comprised the making of the first corner of the mat and the foundation edge to the right.

She sorted out four elements from her pile of material and arranged them in pairs, the second element on top of the first, the fourth on top of the third (fig. 31, *a*). Holding the two pairs parallel between her left thumb and index finger, with her right hand she then folded the upper right hand element (fig. 31, *b*) at right angles in a direction away from her and passed it under the left hand pair. She then bent down the lower member (fig. 31, *c*) of the left hand pair, in order to separate it from the upper member, for her next move was to fold the lower member of the right hand pair at right angles towards her, so that it ran in between the two members of the left hand pair and lay on top of its own mate (fig. 31, *d*). At this point, she turned the work around, still holding it between her left thumb and index finger, so that the other ends of the elements extended vertically. Thereupon she held down the right hand pair so that she could fold at right angles the lower member of the left hand pair towards her and pass it across over the right hand pair, where it lay parallel to the folded ends (fig. 31, *e*). Separating then the members of the right hand pair by folding the lower member back or down and the upper member forward, she folded the remaining right hand vertical away from her around the fold of its mate, between the members of the vertical pair, so that it lay under its mate (fig. 31, *f*). Shoving the work just completed together tightly, she held up to me the first corner (fig. 31, *g*).

Turning the work with this point down, so that the unfolded pair of elements lay horizontally, she entered upon the next stage of the foundation, the making of the right hand edge.

Still holding the work in her left hand, she bent forward the right pair of verticals (fig. 32, *a*) and held them down, while she added a new pair of elements parallel to the horizontal pair. This new transverse element she placed on top of the left hand verticals and, when she had released the right hand pair, under them (fig. 32, *b*). She then folded the left hand verticals forward over the new pair of elements to hold them in (fig. 32, *c*) and turned the work about with the transverse elements in vertical alignment, in order to work on the foundation edge. Repeating her procedure, which had united the original pairs of verticals, the old woman worked the two right hand verticals into the edge and folded the ends forward over the new transverse element (fig. 32, *d, e, f*). In order, then, to start the left hand

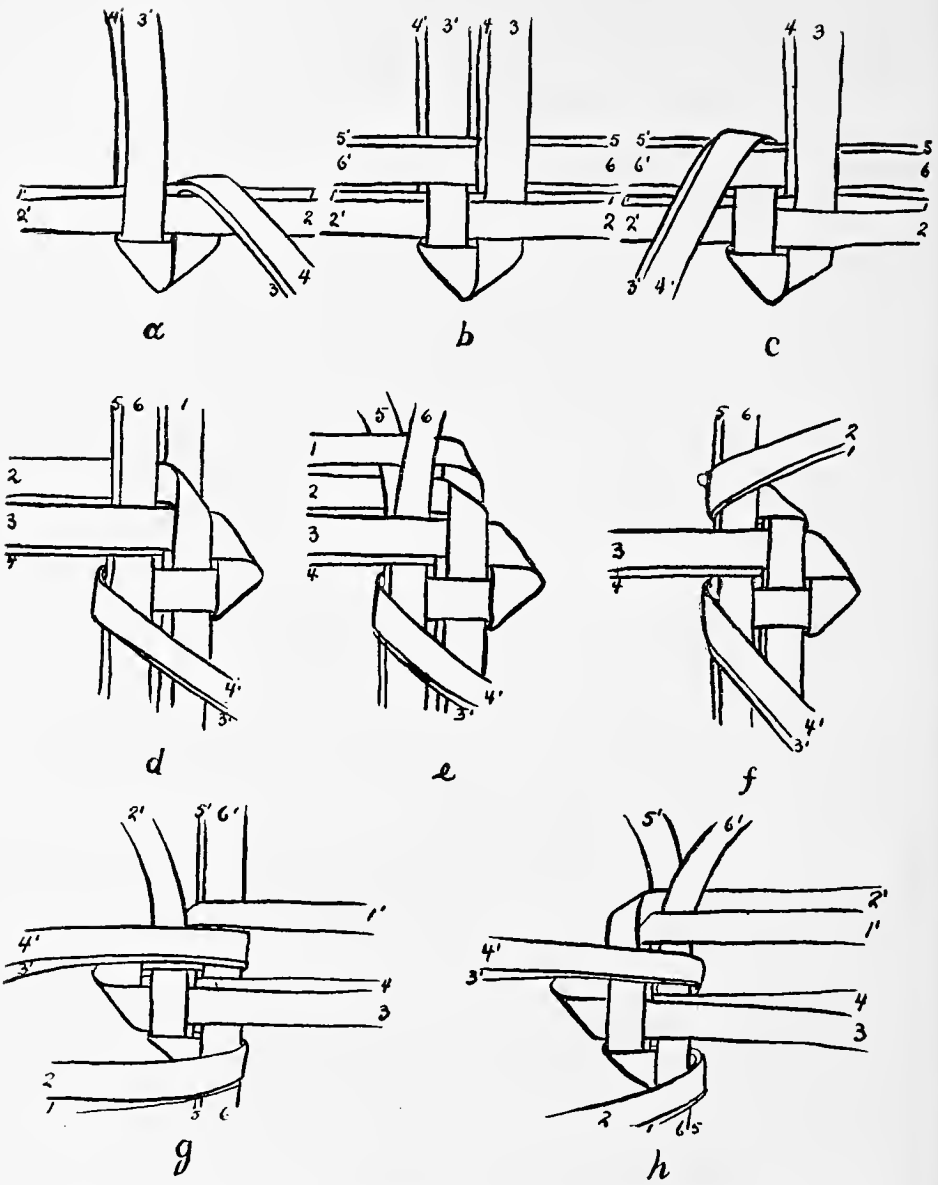


FIGURE 32.—Technique of making *peue*—the foundation edge: *a*, fold forward 3 and 4; *b*, lay 5′-5 and 6′-6 across over 3′ and 4′ and parallel to 1-1′ and 2-2′, replace 3 and 4 in vertical position; *c*, fold forward 3′ and 4′; *d*, turn work about, fold 2 away from worker and pass it under 5 and 6; *e*, fold 1 towards worker, pass it between 5 and 6 and lay it on top of 2; *f*, fold 1 and 2 forward over 5 and 6; *g*, turn work about, fold 1′ towards worker and pass it over 5′ and 6′; *h*, fold 2′ away from worker, pass it between 5′ and 6′ and lay it underneath 1′.

edge, she turned the work about so as to fold the other ends of these verticals in the manner of the former stroke (fig. 32, *g*, *h*).

The start having been made in her hands, the old woman laid the work on the floor in front of her, point towards her (fig. 33, *a*) and, as soon as the checkerwork had grown sufficiently, she put her right foot on the transverse element to hold it.

From that on, she added a single transverse element at a time, but so manipulated her elements as always to have the two needed parallel pairs for making each edge. This she accomplished by turning about at right angles the lower member of each next to the last vertical pair on either edge (fig. 33, *a*), so that it lay under the new single transverse element when it was added (fig. 33, *b*). Again, she held in the new transverse element by folding forward every other vertical, and by folding down or back the alternates (fig. 33, *c*). Again she worked an edge at either side (fig. 33, *d*, *e*, *f*, *g*, *h*), but she no longer turned the work about to accomplish this, making the usual folds with the two pairs of transverse elements as they lay horizontally.

Thus, with the addition of each new transverse element, it was necessary for her to prepare the second pair for the edge stroke by turning the lower member of the next to the last vertical pair so as to lie beneath the new transverse element. However, as soon as a small section of the left hand edge was finished, she ceased, for the time being, to bind in each new transverse element into an edge on that side, stopping the checkerwork one vertical nearer the right edge on each row.

As the right edge diverged with the addition of each new transverse element and the transformation of the right end of each preceding transverse element into a new vertical, the worker settled down to a rhythmic performance of the main stroke or *haunc*, which might be called a kind of hand weaving.

Her right thumb and index carried a warp element up and back across the weft element; her left thumb moved in closely and pressed it down; her right thumb and index brought back the next warp element and folded it forward over the weft element; her left thumb slid in and pressed it flat; and so the "shedding" continued, binding in one weft and preparing for another.

An expert worker, she added a bit of Polynesian dash to this machine-like precision—the regular click of her right thumb nail as it snapped over the edge of her left thumb nail, each time she brought forward and folded a warp element.

When the old woman had extended the right edge of the foundation to the length she desired for the width of the mat, she made the second corner to terminate it. She fixed the final stroke of the foundation edge by folding forward the final vertical pair (fig. 34, *a*), and converted the pair of transverse ends laid down in the last foundation stroke into the point of the corner by folding its members in the following way:

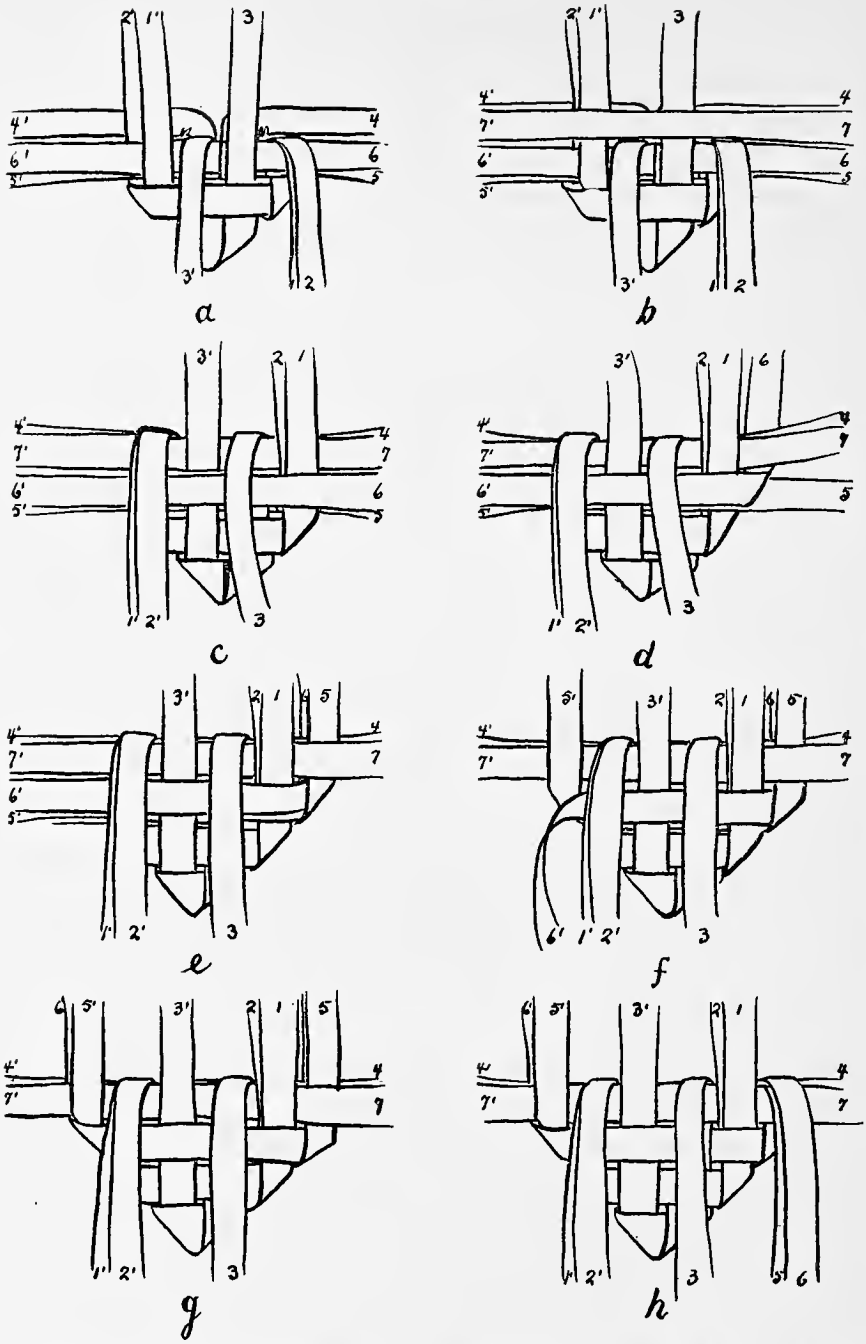


FIGURE 33.—Technique of making *peue*—making the two edges, *fatu* and *hiti aano*: *a*, turn point of corner towards worker, twist 4′ at right angles to left, 4 at right angles to right; *b*, lay 7-7′ across horizontally on top of 4′ and 4; *c*, fold 1′ and 2′ and 3 forward over 7′-7, press 3′ and 1 and 2 back into position across 7′-7; *d*, fold 6 away from worker and pass it under 4 and 7; *e*, fold 5 towards worker, pass it between 4 and 7 and lay it on top of 6; *f*, fold 5′ towards worker and pass it over 4′ and 7′; *g*, fold 6′ away from worker, pass it between 4′ and 7′ and lay it underneath 5′; *h*, fold forward 5 and 6 over 4′-4 and 7′-7.

She folded the upper member of this pair away from her at right angles (fig. 34, *b*) and the lower member towards her, so that it fell as the upper member of the new vertical pair (fig. 34, *c*). Again she folded this upper vertical at right angles towards her, so as to form a new transverse element (fig. 34, *d*). Thereupon she separated the adjacent vertical pair, raising its upper member and pressing it back over the new transverse element (fig. 34, *e*). This opened the way for her to fold the lower member of the final vertical pair towards her and lay it across on top of the new transverse element and crossing over the vertical just pressed down (fig. 34, *f*). When she had raised the lower member of the adjacent vertical pair and pressed it down over its fellow (fig. 34, *g*), the corner had been turned and it was possible to start upon the second length edge (fig. 35, *hiti aano* No. 2). The lower edge (fig. 35, *hiti aano* No. 1) to the left of the *haamota pcho* (beginning corner) she made throughout in sections according to the method of figs. 33, *f*, *g*. She did not work on it consistently until the starting of the side opposite it, when she still worked in sections, but frequently, so as to make it keep pace with the transverse elements she was folding in at the opposite edge.

The second corner, the upper right hand corner, being turned, she folded the upper right hand edge in a manner differing somewhat from that of the foundation edge, but with similar result.

Preparatory to the stroke, she folded forward the next to the last pair of verticals and the single vertical adjacent on the left, whereupon she twisted about at right angles the lower member of the last horizontal pair turned across at the corner (fig. 34, *h*). She then pressed the third vertical down into place on top of this twisted horizontal (fig. 34, *i*). Folding the upper member of the final pair of verticals at right angles towards her, so as to make a new transverse element adjacent to the last one (fig. 34, *j*), she bound this in by pressing down across it the upper member of the second vertical pair as it lay folded forward (fig. 34, *k*). Folding, then, the lower member of the final vertical pair at right angles towards her, she laid it across as a transverse element on top of the one just laid down (fig. 34, *l*) and bound it in by pressing down across it the other member of the second vertical pair (fig. 34, *m*). The edge stroke was completed by folding forward the new second vertical pair (fig. 34, *n*). After each such stroke on the upper edge, *hiti aano*, she bound in the new transverse element, working from left to right between the lower and upper *hiti aano* with the rhythmical precision of the *haune* stroke.

When she had extended the upper right hand edge to the measure determined upon for the length of the mat, the old woman entered upon the turning of the third corner, that at the upper right side. Up to this point she had worked upon the *pae maitai*, good side, but at this stage she turned the work over, so that the *pae ino*, bad side, lay uppermost. In this position, before turning the third corner, she continued the edge which had been the upper right, but now lay on the left (fig. 36, *a*) for four complete strokes, each of which consisted of the following moves:

After laying the transverse element across and pressing down over it all the upper verticals save the final two pairs, she turned the upper member of the right hand vertical pair so as to lie on top of the single transverse element (fig. 36, *b*). She then folded the lower member of the former transverse pair towards her and laid it across the new transverse pair as a new vertical to the left (fig. 36, *c*)

FIGURE 34.—Technique of making *peue*—the second corner and the second *hiti aano; a,* fold forward 1 and 2; *b,* fold 3 away from worker; *c,* fold 4 towards worker and lay it on top of 3; *d,* fold 4 again at right angles towards worker; *e,* separate 1 and 2, press 1 back over 4; *f,* fold 3 towards worker, pass it over 1 and lay it on top of 4; *g,* press 2 back over 3 and 4; *h,* fold forward 5 and 6 and 7, twist 4 about at right angles; *i,* press 7 back into place on top of 4; *j,* fold 2 towards worker and pass it over 4 and 7; *k,* press 5 back over 2; *l,* fold 1 towards worker, pass it over 5 and lay it on top of 2; *m,* press 6 back into position over 1 and 2; *n,* fold 4 and 7 forward over 1 and 2.

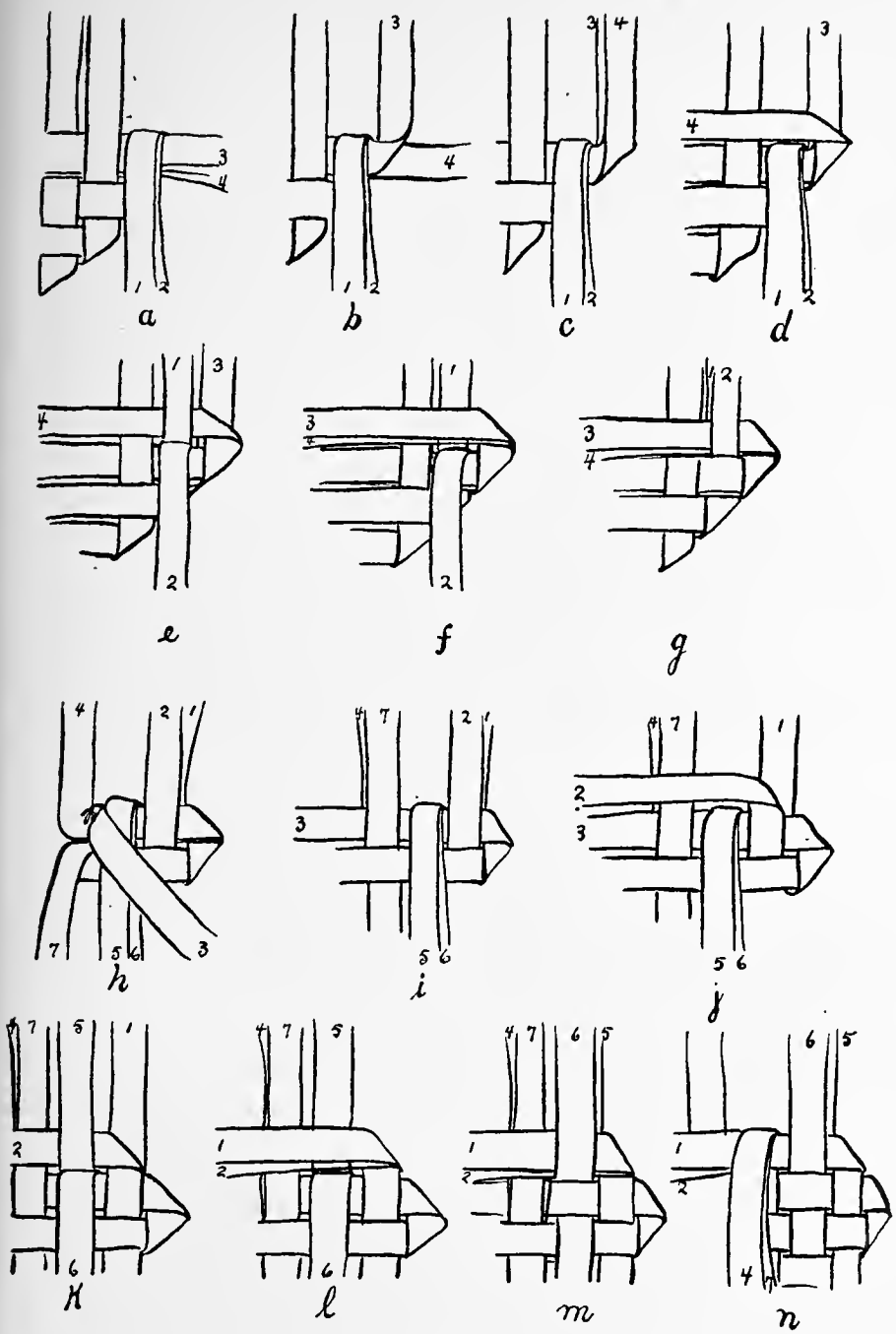


FIGURE 34

and completed the edge stroke by folding the upper member of the former transverse pair away from her, so as to pass between the two members of the new transverse element and lie underneath the new vertical (fig. 36, *d*).

When four such edging strokes had been completed, she turned the third corner, thus:

She made the point with the last pair of transverse ends folded about each other and returned into the mat as an adjacent transverse pair. First, she folded the lower member towards her and parallel to the verticals (fig. 36, *e*); then she folded the upper member away from her and around its mate (fig. 36, *f*). Again she folded this upper member—this time towards her, so that it enclosed the lower member, now converted into a vertical, and lay parallel to itself as a new transverse element (fig. 36, *g*); and again she folded the lower member—this time away from her—around its mate and passed it between the members of the adjacent pair of verticals and laid it underneath its mate as the new transverse pair (fig. 36, *h*).

Thus she made a beginning on the fourth edge, called the *taviri* edge; and when she had repeated the usual left edge stroke with the pair of verticals and the pair of transverse elements left available (figs. 36, *i*, *j*), she began to fill in towards the final corner, working back and forth, from left to right and from right to left, between the new *taviri* edge and the original *hiti aano* (fig. 36, *k-n*). For the central portion she used the usual checkerwork. The edges require detailed description:

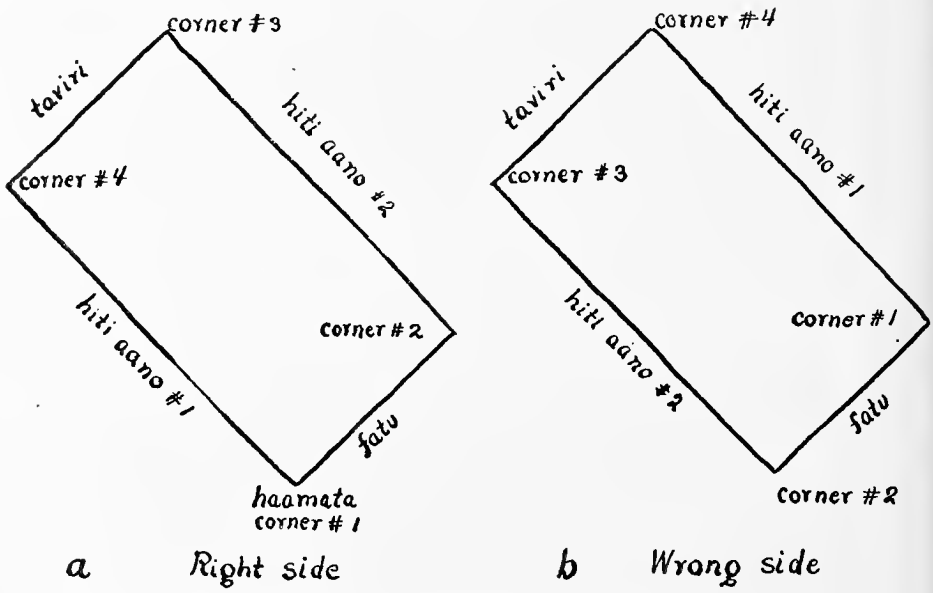


FIGURE 35.—Diagrams of *peue*, showing naming of corners and edges.

Starting with the left edge or *taviri,* she completed the second vertical pair by twisting the upper member of the former transverse element (fig. 37, *a*) and laying it on top of the single vertical adjacent to the end pair. Folding the lower member of the left hand pair of verticals towards her, she passed it across the second vertical pair as a new transverse element. She then folded the upper member of the last vertical pair away from her, passed it around its mate and between the two members of the next vertical pair and laid it underneath its mate (fig. 37, *b*).

Thereupon, she prepared the way for the next *taviri* edge stroke by raising the adjacent vertical, then folded forward, pressing it down, and by twisting the upper member of the former transverse pair about to lie on top of it (fig. 37, *c*). As further preparation, she folded towards her the upper horizontal and left it hanging for a future *taviri* stroke.

Moving, then, to the right edge of the mat, she turned the upper member of the final vertical pair away from her and laid it as a transverse element underneath that one laid down from the opposite side, passing it between the members of the final left hand pair of verticals and letting its end hang loosely from the edge of the mat (fig. 37, *c*).

In order to complete the edge stroke for the right side, she brought the lower member of the final vertical next into play.

Separating the adjacent vertical pair by pressing the upper member back over the transverse element, she folded the final vertical towards her and laid it parallel to the former transverse elements. After passing it between the members of the separated vertical pair and over its adjacent vertical pair, she twisted it to the vertical and laid it down on top of the single vertical as the upper member of a new vertical pair (fig. 37, *d*). After pulling the pair of transverse elements tightly in place, one on top of the other, she bound them into the mat by folding forward and back the alternate verticals in the regular checker stroke (fig. 37, *e*). The lower transverse element from the left side she carried through under and over four or five crossing verticals and then dropped it out of the weaving, cutting off its end when the mat was completed. Similarly, the end of the transverse element running from right to left was cut off at the edge in the final stage of the manufacture.

Thus she continued the process:

(1) Making the left *taviri* edge stroke after twisting the upper transverse element, which had been left folded forward in the previous stroke, and laying it on top of the adjacent single vertical and folding the new upper transverse element forward out of the way; (2) making the next stroke on the right edge (*hiti aano*), carrying a single transverse element across from right to left to lie under the lower transverse from left to right and passing it between the two members of the final left hand pair of verticals, where she left it hanging from the edge; (3) binding in the two new transverse elements with the folding forward and back of the alternate verticals, the one running left all the way across, that running right for four or five strokes; (4) preparing for the next right hand edge stroke by twisting the upper transverse element, laying it on top of the first single vertical from the right edge, and folding the next to the final vertical pair forward to hold it. Working back and forth, she developed the converging edges and filled in the checkerwork between them. At every round of the

FIGURE 36.—Technique of making *peue*—third corner and edges on either side of it: *a-d,* in preparation for third corner, twist vertical 6 about and lay it on top of transverse 3, fold 2 towards worker and pass it across over 3 and 6, fold 1 away from worker, pass it between 3 and 6 and lay it under 2; *e-h,* turn third corner, fold 3 towards worker, fold 6 away from worker, around and under 3, fold 6 again at right angles, this time towards worker and pass it over 1 and 2 and under 4 and 5, fold 3 again at right angles, this time away from worker, pass it between 1 and 2, under 4 and 5 and over 7; *i-j,* start *taviri* edge stroke, fold 1 towards worker and lay it across over 4 and 5 and under 7, fold 2 away from worker, around 1, pass it between 4 and 5 and lay it under 1; *k-n,* make right edge strokes on wrong side, fold 17 away from worker and pass it over 13 and 18, press 14 back into position over 17, fold 16 towards worker around 17, lay it on top of 17 crossing over 14, 13 and 18, twist it about and lay it on top of 12, fold 13 and 18 forward over 17 and 16.

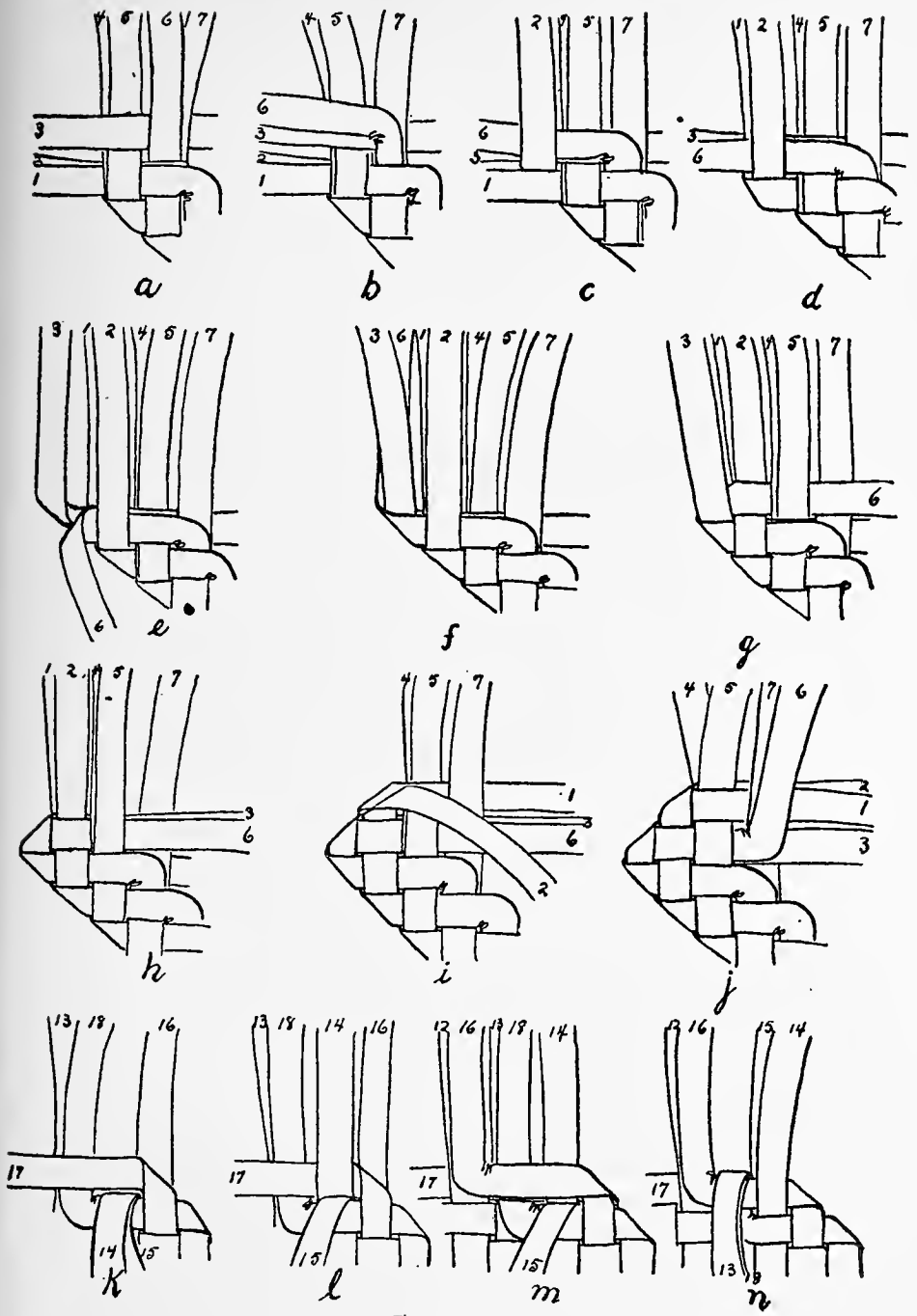


FIGURE 36

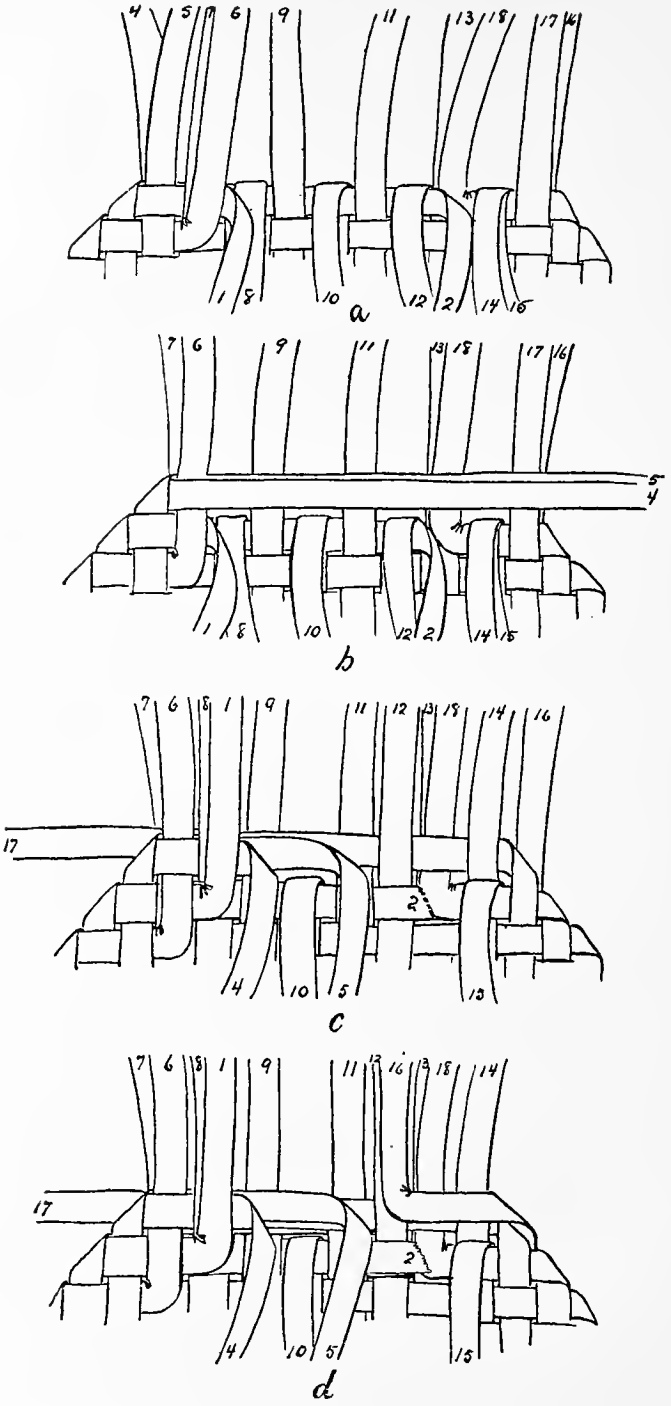


FIGURE 37

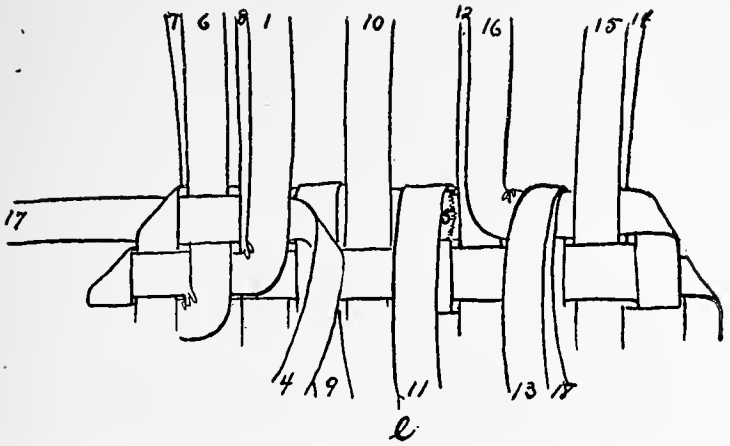


FIGURE 37.—Technique of making *peue*—working between *taviri* and *hiti aano* edge No. 1: *a*, twist 6 about and lay it on top of 7; *b*, fold 4 towards the worker and pass it across over 6 and 7, 9, 11, 13 and 18 and 17 and 16, fold 5 away from the worker, around 4, pass it between 7 and 6 and lay it under 4; *c*, fold 17 away from worker, pass it across over 13 and 18, 11, 9 and between 7 and 6, laying it under 4 and 5, fold back into position over 17, 8, 12 and 14, twist 1 and lay it on top of 8; *d*, fold 16 towards worker around 17, pass it over 14, 13 and 18, twist it about and lay it on top of 12; *e*, fold 10 back into position over 17 and 5, fold forward 9, 11 over 17 and 5, and 13 and 18 over 17, and 16, cut off hanging end of 5.

process she dropped out two transverse elements, one at the left or *taviri* edge; the other 4 or 5 inches from the left edge. These she trimmed off in finishing the mat.

However, as the edges converged, she carried both horizontals all the way across to their opposite sides and left their ends hanging from both edges. As the mat narrowed down to the final corner (fig. 38), she somewhat modified her technique, folding across the first transverse element from the left edge on top of the two from the right edge, before closing the separated verticals (No. 5, No. 6) on the right, and adding on top of these transverse elements the second from the left edge, so that two horizontals hung out from each edge stroke (figs. 38, a-d).

In the actual making of the last corner, she manipulated the elements in pairs.

Folding the right pair of verticals away from her around the left hand vertical pair (fig. 38, *e*), and then the left pair towards her across to the right (fig. 38, *f*), she next folded forward the ends of the left (fig. 38, *g*) and stuffed them into the weave (fig. 38, *h*). The loose ends on the right she folded back and stuffed them into the weave on the other side of the mat.

When she had cut off all the hanging ends, she handed me the completed *peue*.

It is sometimes said that the *peue* were formerly decorated by shoving strips of the dark brown skin of the *fei* (*fe'i*) into the checkerwork in various geometric patterns, but none of this description may be seen today.

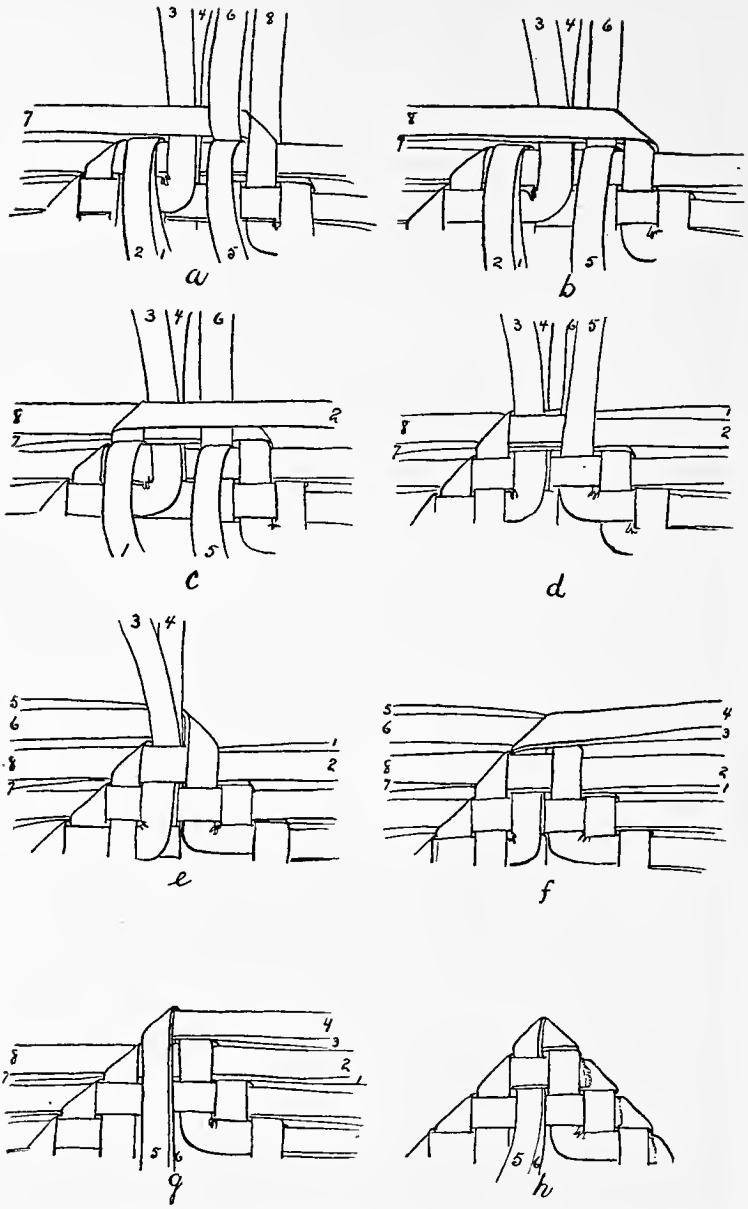


FIGURE 38.—Technique of making *peue*—the fourth corner: *a*, fold 7 away from worker, press 6 back into position across 7; *b*, fold 8 towards worker around 7, pass it over 6 and 3 and 4 and lay it on top of 7; *c*, fold 2 towards worker, pass it across 3 and 4 and 6, laying it on top of 7 and 8; *d*, fold 1 away from worker and around 2, pass it between 3 and 4 and under 6, press 5 back into position over 1 and 2; *e*, fold 5 and 6 together away from worker and pass them under 3 and 4; *f*, fold 3 and 4 together towards worker and pass them over fold of 5 and 6; *g*, fold 5 and 6 forward over fold of 3 and 4; *h*, stuff 5 and 6 into weave on near side of mat, fold 3 and 4 away from worker and stuff them down into weave on far side of mat, cut off 1 and 2, 7 and 8, and so on, close to edges of mat.

Pahii.—Small mats of lauhala, called *pahii,* like the *peue* in manufacture, are made for seats and for pallets on which to lay babies upon certain occasions, as when they are given their names in the Government House. These differ from the *peue* only in size, measuring about 21 by 28 inches.

Modern mats.—Modern mats of lauhala, which are made for table covers, follow a technique probably not of native origin. They are not woven from one corner, so that the elements run obliquely across the rectangle of the mat, but are constructed from the center out of true verticals and horizontals running parallel with the edges of the mat. Of regular checkerwork, some are embellished with holes (*puta*) left in the weave so as to form patterns having somewhat the appearance of drawn work on linen. The checkerwork of some is varied by splitting the elements after a central mat of wide elements has been woven and working the border of the narrower ones. These modern mats are finished with various types of ornamental edges, some with fringes of piripiri bark or purau bark tied to the plaitwork, some with the "thorn" edge, which is very simply accomplished by turning the elements back into the weave, folding them first towards the worker into vertical line (fig. 39, *a*), then towards her again to

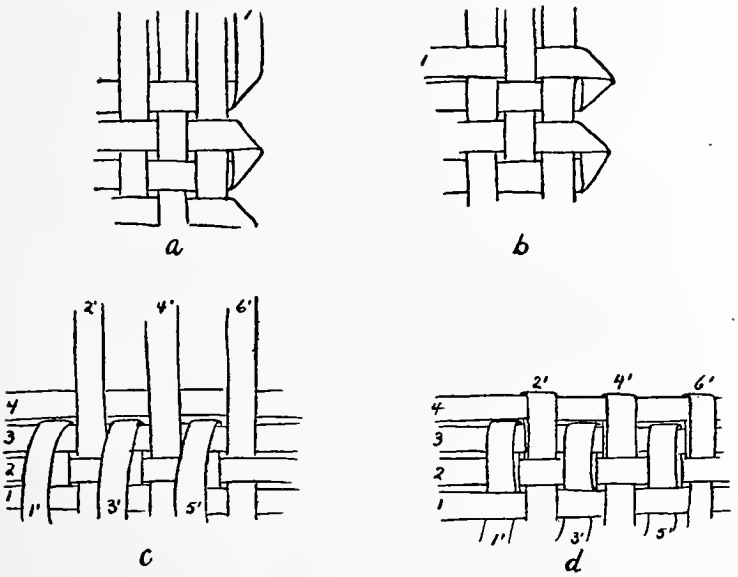


FIGURE 39.—Processes of edges on checkerwork mats: *a, b,* for the *taratara,* fold 1 towards worker into vertical, fold 1 again towards worker into horizontal and pass it into checkerwork; *c, d,* for another simple finish, fold forward 1′, 3′, 5′, and so on to hold in 3, lay 4 across under 2′, 4′, 6′, etc., fold 2′, 4′, 6′, etc., around 4 and stuff into weave on wrong side, stuff 1′, 3′, 5′, etc., into weave on right side.

the horizontal (fig. 39, *b*). When matting of this type of vertical-horital elements is worked of sugar-cane tassel stems for the *tiputa* (tunic used in dancing), a simple edge is put upon some in the following fashion:

When the last transverse element is laid across, it is put beneath all the verticals (fig. 39, *c*), and the alternate vertical elements are folded back over it and around it, and their ends stuffed into the weave on the wrong side of the mat. The remaining verticals are then folded forward around the next to the last horizontal and stuffed into the weave on the mat on the right side (fig. 39, *d*).

Sails.—In the heydey of their culture, the sailing craft of the Tahitians were equipped with sails made of lauhala mats, which Ellis says were lighter than canvas and less durable. Nothing is known of their manufacture, but they seem to have been very tall and narrow, in shape somewhat like the half of an oval. It is probable that they were constructed after the fashion of the floor mat.

LAUHALA CLOTHING

The matting which enters into the making of costumes is of a modern variety, and, aside from the single specimen in the Papeete Museum (Pl. XI, *B*), on which the plaiting is of vertical twilled-twos to a depth of 12 inches, the only acquaintance with the fine *purau* mats once worn as clothing may be had through descriptions. According to an old savant of Maupiti, the chiefs and warriors wore mats of inner purau bark woven check-wise into a tunic-like garment known as the *tiputa*. Ellis corroborates this use of purau bark and gives the following detailed description of the technique of their manufacture:[9]

The bark was slit into narrow strips frequently less than the eighth of an inch wide. They were woven by the hand, and without any loom or machinery. They commenced the weaving at one corner, and having extended it to the proper width, which was usually three or four feet, continued the work till the mat was about nine or ten feet long, when the projecting ends of the bark were carefully removed, and a fine fringe worked round the edges. Only half the pieces of bark used in weaving were split into narrow strips throughout their whole length. The others were slit five or six inches at the ends where they commenced, while the remaining part was rolled up like a riband. These they unrolled, and extended the slits as the weaving advanced, until the whole was complete. When first finished, they are of a beautifully white colour, and are worn only by the men, either bound round the loins as a pareu, or with an aperture in the centre as a tiputa or poncho, and sometimes as a mantle thrown loosely over the shoulder. Their appearance is light and elegant, and they are remarkably durable, though they become yellow from exposure to the weather.

On Maupiti it is said that formerly house mats were plaited of purau bark with the ends of the fibers left hanging on one side as a kind of hairy lining designed for warmth.

[9] Op. cit., pp. 186-87. See also Moerenhout, J. A., Voyages aux Iles du Grand Ocean, vol. 2, pp. 34-35, Paris, 1837; Corney, B. G., The quest and occupation of Tahiti, by . . . Spain, vol. 1, p. 331, note 2, London, 1913; Banks, Sir Joseph, Journal, p. 132, London, 1896.

FANS

Though the fans woven today in the Society Islands are modern in appearance with their combinations of materials made gayer by bright commercial dyes, they are still very simply constructed in reminiscence of the older coconut leaf fans. Lauhala and bamboo are the favorite materials today, but they are made of simple checkerwork plaited about a central stick which serves as a handle and a central rib for the triangular or diamond shaped matting. The regularity of the checkerwork is varied by the occasional introduction of very wide elements in combination with very narrow ones (Pl. XII, *A*). When the ordinary checkerwork is made into a triangular mat, the fan is finished with a dyed fringe of piripiri bark and bound with the braid known as *puupuu taratara* (Pl. XII, *B*).

The technique of the older form of coconut leaf fans today may be studied only from old specimens fortunately preserved in a few museums. A fan in the Peabody Museum at Harvard apparently is representative of the old type. It is constructed about a central stick, tapering at one end, simply carved in handle form at the other, in the following way:

Bound on opposite sides of the stick are two halves of a coconut leaf split down its midrib and evidently prepared much in the fashion of those for the *ara iri* basket (p. 39). A section of leaf, to which 21 leaflets adhered on either side, was cut, its midrib split, the edges of its folded leaflets stripped away, the fibers of each half-rib pared off until only a cord sufficient to bind together the leaflets was left. Such were the coconut leaf sections which were bound on either side of the stick with coconut fiber cord which was wrapped round and round from butt to tip catching the rib fibers below the butt of each leaflet (fig. 40, *a*). The worker evidently held the stick in her lap, tip down, and worked from handle to tip, that is, towards her, in plaiting together the leaflets from either side into a three-ply plait across the front of the stick (fig. 40, *b*). Turning the back of the stick towards her, she then gathered up the leaflets as they hung out from each crossing of the plait on the front and plaited them also into a three-ply plait across that side of the stick, so that the entire stick was encased in this plaitwork and the leaflets hung out from either side ready for the matting (fig. 40, *c*).

Before entering upon the checkerwork of the fan mat, each leaflet, which had been kept doubled about its midrib and had been split to ¼ inch in width, was now split in half, so that each supplied for the work a semirigid element, composed of the rib, and a flat leaf element ⅛ inch wide. The matting was evidently done on the right side, the stick being laid across the lap so that the elements, running out more or less vertically from the worker, could be worked first on one side of the stick, then on the other. Working from right to left on one side and from left to right on the other, one by one the verticals were folded to form an oblique edge and laid across as transverse elements in the regular checker stroke (fig. 40, *d*), the alternating, semirigid rib elements giving a plaid effect to the checkerwork. When a triangular mat had thus been completed on either side of the stick with the plaiting in of all the elements (fig. 40, *e*), the worker evidently turned the fan about, the handle in her lap, and plaited the top triangular segment (fig. 40, *f*). Inclining the

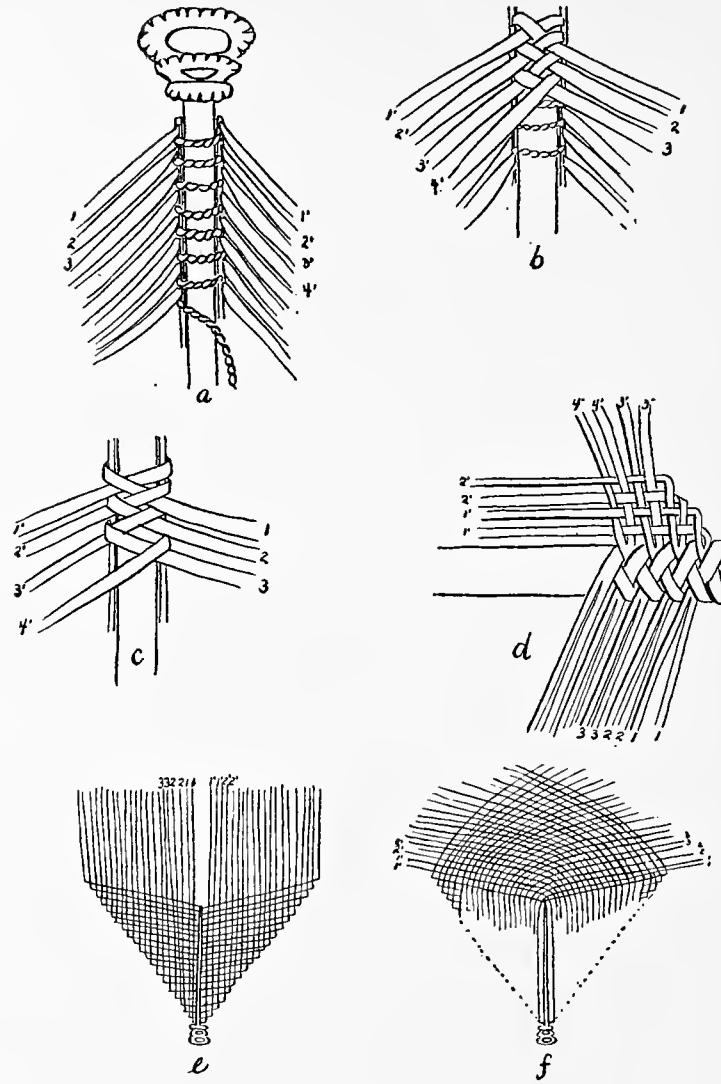


FIGURE 40.—Technique of making coconut leaf fan: *a*, bind on either side of central stick section of half a coconut leaf with midrib pared down and leaflets stripped to narrow ribbons; *b*, plait leaflets across back of stick; *c*, pull leaflets around and plait them across front of stick; *d*, split leaflets into halves, 1′ and 1′, 2′ and 2′, and so on, and manipulate them as separate elements, twist 1′ at right angles and cross it under 1′, over 2′, under 2′, over 3′, under 3′, etc., twist other half of 1′ similarly and plait it across verticals in turn; *e*, *f*, diagrams showing lines followed by elements in checkerwork pattern.

right hand elements to act as sinistrals and the left hand as dextrals, she interwove them from the center up and out. The top edge of the fan follows the line of a flat arc and seems to have been made in a fashion similar to the final edge of the lauhala mat with its border on the wrong side.

Braiding

Hat Braids.—Illustrative of the ingenuity and skill of the people of the Society Islands, and almost certainly of their traditional methods of plaiting, the modern manufacture of hat braids seems worth discussing in this report. In the light of its present development, which includes every woman and girl in the islands as a worker, the story of the initiation and early growth of this industry is of some interest, particularly to students concerned with the borrowing and adaptation of alien cultural elements and the rapidity of their assimilation. Ellis[10] gives a complete description of the evolution of millinery from the early simple sunshade to the European hat, and incidentally a revelatory picture of the interplay of foreign and native ideas:

> The inhabitants formerly wore a kind of bonnet, or, rather, shade for the eyes, made of leaves of the cocoa-nut, in a variety of forms, many of them tasteful and elegant. They were called *taupoo* or *taumata,* and, as the latter name signifies, were designed to skreen the face or eyes; it being composed of *tau,* to hang upon or cover, and *mata,* face or eyes. It was worn on the forehead immediately below the hair, and fastened by a narrow leaflet passing round the back of the head above each of the ears, leaving the whole of the back and upper part of the head entirely exposed.
>
> . . . Hats and bonnets were, however, introduced among the natives by our friends in Raiatea, with whom many valuable improvements have originated; and the first hats and bonnets ever made in the islands, and worn by the natives, were made by Mrs. Williams and Mrs. Threlkeld, in the spring of 1820. Their appearance on the heads of the natives of Raiatea produced no slight sensation there; and the report of their use, as it spread through the islands, occasioned a considerable stir.
>
> Highly approving of whatever had a tendency to civilize the natives, or to furnish them with useful employment, we rejoiced at their introduction, and endeavoured to persuade the natives of Huahine to follow the example of their Raiatean neighbours. Whether, however, they were influenced by a feeling of pride which made them averse to imitate the Raiateans, or an unwillingness to increase their domestic employments, we do not know; but the females in general, the queen and chief women in particular, seemed at first determined to resist the innovation. The men rejoiced at the idea of making hats; and yet, notwithstanding this, and the repeated offers of Mrs. Barff and Mrs. Ellis to teach the females to plat, and to make the plat into bonnets and hats, they were exceedingly averse to learn. Following the example of those in Raiatea, their teachers made bonnets for themselves with the bark of the purau; and though the chief women acknowledged that they looked well on them they said they had not yet procured the articles necessary to form a complete European dress, that many were still without shoes and stockings, and that it would be quite ridiculous for the head to be covered with a bonnet after the fashion of the foreigners, while the feet, like those of the islanders in general, were without shoes.

[10] Ellis, William, Polynesian researches, 2nd ed., vol. 2, pp. 399-403, Paris, 1831.

A short time afterwards, several of the natives of our island sailed over to Raiatea, and returned with very flattering accounts of the improved appearance of those who wore hats and bonnets. This induced in several of the chief women, who had at least one complete English dress, a desire to learn to make them, and ultimately to substitute the European bonnet for the native taumata. A visit which a number of chiefs and their wives, from Raiatea, paid to Huahine, increased their eagerness for this new article of dress—which, when once adopted, was never laid aside.

The desire now became general, and was not confined to those who possessed other articles of foreign dress, it being extended even to such as had none. Thus, wearing a hat and bonnet was the first advance they made towards a more civilized appearance and dress. Our houses were now thronged by individuals anxious to be instructed; and so soon as Mrs. Barff or Mrs. Ellis had taught any of the females, these immediately taught others; and those who excelled in the fineness of their platting, or in putting it together, were fully employed by the chiefs and others, and derived no small emolument from their new avocation. . . . . The hats and bonnets were at first made with the inner bark of the slender branches of the purau, or the leaves of a fine species of rush. The former was beautifully white and glossy, while the latter was of a yellow colour, and much more firm and durable, on which account it was preferred for hats. . . . . The use of hats increased so rapidly that all the European thread in the islands was soon expended. There were no haberdashers' shops at hand, whence a supply could be procured; recourse was therefore had to native productions. Some employed the long filaments of the dried plantain-stalk; others split the thin bark of the purau into fine threads or fibers, and, though not equal in strength to the twisted thread, both answered remarkably well. . . . . .

Trimmings are not so scarce now as formerly, but the supply taken is still inadequate to the requirements of the people, among whom bonnets and hats are now so common, that before I left the Leeward Islands, scarcely a man, woman, or child was to be seen out of doors without one—many of them possessing two, and sometimes three or four.

They are made entirely by the females, who manufacture not only for themselves, their husbands, and their children, but, in some of the stations, several have formed themselves into a kind of society for the purpose of making bonnets for the poor and aged, who are unable to make for themselves. The bonnets are either sewn together, or woven throughout, after the manner of Leghorns, and are made not only with the leaves of the mau, and the bark of the purau, but of the fine white layers of the inside of the plantain stalk, the leaf of the sugar-cane and a strong and beautiful species of fine grass.

It is very obvious that the preparation of materials for these braids was taken over from genuinely native processes, and it is open to question how much of the varied technique of plaiting now employed, the missionary ladies introduced to these nimble-fingered people, who had always been accustomed to making braids for other purposes.

A visit to the British Museum might give the opportunity for describing in detail one of those early *taumata* or *taupoo* mentioned by Ellis, as well as by Banks [11] and Corney,[12] for Edge-Partington and Heape give a drawing of one preserved in that institution (fig. 41);[13] but in the islands

[11] Banks, Joseph, Journal of the Right Honorable Sir Joseph Banks, edited by Sir Joseph D. Hooker, p. 132, London, 1896.

[12] Corney, B. G., The quest and occupation of Tahiti by emissaries of Spain, vol. 2, p. 33, notes, London, 1915.

[13] Edge-Partington and Heape, Album of the Pacific islands: pl. 33, no. 5, fig. 41, Manchester, 1890.

only the most fragmentary recollections of them may be awakened. Marau Taaroa, the ex-Queen, remembers that Pomare IV clung to the old style and that all her sunshades were woven, somewhat as are baskets, of the reddish yellow leaves of a particular and rare variety of coconut tree, a preference confirmed by Wilson.[14]

Within the modern manufacture, two methods are in vogue: the weaving of a hat as a whole in a single mat; and the plaiting of braids which are afterwards sewed together in hat form. The first and less common method adapts the regular weaving of the lauhala mats, the worker proceeding with the checkerwork in circles over and around a cylindrical

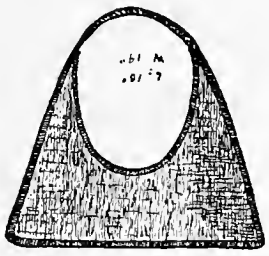


FIGURE 41.—Sunshade of finely plaited coconut fiber.
(Copied from a drawing by Edge-Partington and Heape, Album of the Pacific Islands.)

block of wood to induce the proper shape. The fabrication of braids may make a distinct contribution to knowledge of purely native methods of manipulating elements in plaitwork. Marau is of the opinion that many of the present braids are but replicas of old ones, which were used to wrap house posts with ornamental patterns. The Peabody Museum of Harvard presents evidence of yet another use of a braid fashioned as is one of those now called modern, in an old Tahitian military gorget made of coconut fiber braids sewed together, row after row. The braid is of ten-ply and is of the type known today as *titona ahuru.*

Lauhala is considered too coarse a material for any but rough, everyday hats and it is usually plaited only into the form of the simple braid known as *titona,* though it is often rendered a bit more dressy by an admixture of glossy bamboo elements dyed in bright colors. Bamboo is the material coveted for particular occasions, though the old people prize the native pia more highly; and *aeho,* with sugar-cane a close second, is popular for Sunday wear. The materials for the many different forms of braids are stripped to varying widths from 1/32 inch to ½ inch; and these elements

[14] Wilson, James, A missionary voyage to the southern Pacific Ocean, 1796-98, in the ship "Duff," p. 338, London, 1799.

are handled in more or less the same fashion, whatever the stroke employed in the plaiting.

After folding them about one another so as to create the desired number of sinistral and dextral elements—or sometimes after crossing the fine strips of broad leaves whose butts, left unstripped and whole, hold the elements in place—the worker holds the ply between the left thumb and index finger and manipulates them with her right hand, always plaiting up or away from her. She selects as the working ply that at the extreme left, then at the extreme right, then left, and so forth; and, though she turns the edges in various ways, it is usually in order to convert the working ply from sinistral to dextral, or vice versa, and plait across its neighboring parallels. Whatever the number of ply held down for the working ply to cross, and however they may be selected, she always bends them over her left index finger with her right hand and holds them there by pressing the left middle finger against them.

Some braids are plaited with two straight edges, to be sewed in coils for the crown of the hat, some with one straight edge and one fancy one for the edge of the brim or even for the brim lining, and others with two fancy edges for the whole of an ornate hat.

The simplest braid has two straight edges and is designated as a *titona.* The possibilities of variation in pattern occasioned by the use of different strokes of plaiting are multiplied by the use of ply of different widths and colors which bring out innumerable designs (Pl. XIII, *A*). The *titona* braids are designated by the number of ply used in the plaiting, called *titona toru, titona maha, titona pae, titona ono, titona hitu,* and so forth, according as they are fabricated from three-, four-, five-, six-, seven-ply. Some are of diagonal checkerwork, some of twilled work; all the simpler ones of three-, four-, and five-ply are checkerwork; most of those of six-ply or more are of vertical twilled-threes or twilled-twos, plain in combination with each other or with checker strokes. For instance, the *titona ono* (six-ply) is a combination of one checker stroke and one twilled-two (Pl. XIII, *A, d*); the *titona hitu* (seven-ply) may be worked entirely in twilled-twos (Pl. XIII, *A, g*); the *titona vau* (eight-ply) combines one stroke of twilled-twos with one of twilled-threes (Pl. XIII, *A, h*); the *titona iva* (nine-ply) is entirely of twilled-threes (Pl. XIII, *A, i*). However, braids of all numbers of ply are worked entirely in checkerwork. In the *titona* of twilled-work, the working ply is held down as the last lower element to be crossed over by the succeeding working ply, the required number of lower elements for the twill being added to it from either side (fig. 42, *a-c*); but in those of checkerwork, the lower elements are the alternate elements counted off from either edge, the third, fifth, seventh, etc., sinistrals or dextrals being held down (fig. 42, *d-f*).

The folding of the ply so as to make straight edges is characteristic of the *titona* braids. The ply of braids are folded in two of the ways used in matting—away from the worker or towards the worker; but not at right angles as in matting, for the line of direction of the ply is oblique. In the *titona* braids, save for the three-ply (figs. 43, *a-d*), where both sinistral

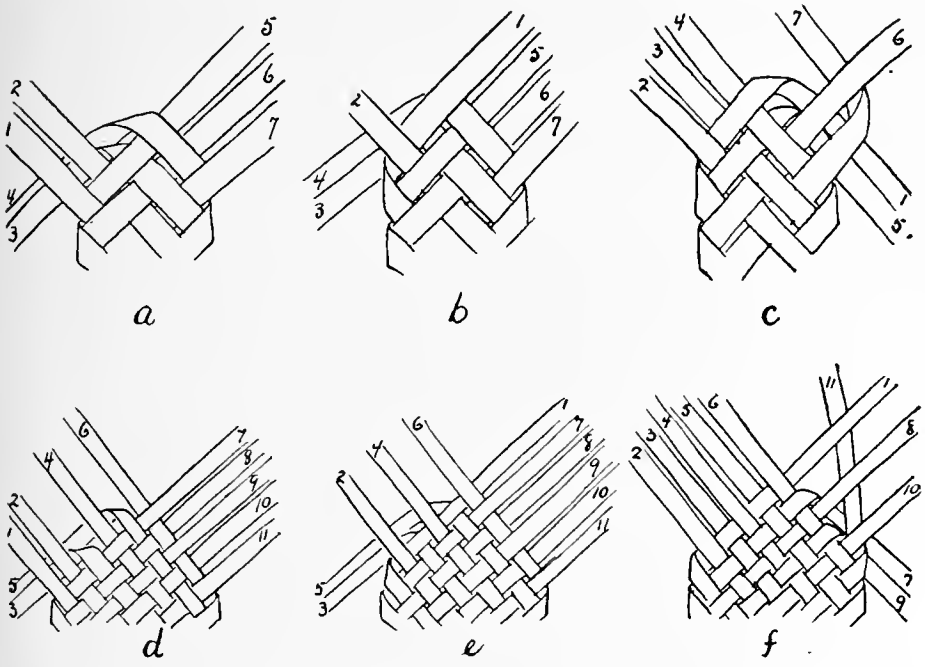


FIGURE 42.—Technique of making hat braids; selecting the lowered elements: *a-c*, in a *titona* braid of twilled-twos, press down 3 and 4, fold 1 away from worker, pass it under 2 and over 3 and 4, press down working ply 1, add to it its adjacent on right 5, fold 7 away from worker and pass it under 6 and over 5 and 1; *d-f*, in a *titona* braid of checkerwork, press down alternate sinistrals 3 and 5, fold 1 away from worker and pass it over 3 and 5 and under 2, 4, 6, press down alternate 7 and 9, fold 11 away from worker and pass it over 7 and 9 and under 10, 8, and 1.

and dextral ply are turned towards the worker and in the four-ply (fig. 43, *e-g*), where the dextral is turned towards the worker and the sinistral away from her, the ply are turned on both edges away from the worker (fig. 42, *a-f*).

The more elaborate *titona* braids, of sometimes as many as forty-five or fifty-ply, each ply not more than 1/32 inch or perhaps 1/16 inch wide, are no longer designated by number of ply but are called *manua*. These, which are usually made of *aeho* or of sugar-cane reed, the native workers

have evolved in a great number of patterns, combining checkerwork with vertical or horizontal twilled-work to suit their fancy. Those of vertical twills are the simplest in pattern, most of them being entirely of twilled-twos. However, the introduction of another color—usually dark brown *oaha* (the skin from the rib of the bird's nest fern leaf) combined with yellow *aeho* creates striking designs. Such a design of twilled-twos is called *e ru* (Pl. XIII, *B, a*); while that evolved from ply of two colors, each plaited through two strokes of twilled-twos and two of checkerwork (Pl. XIII, *B, b*) is known as *e fifi* (chain).

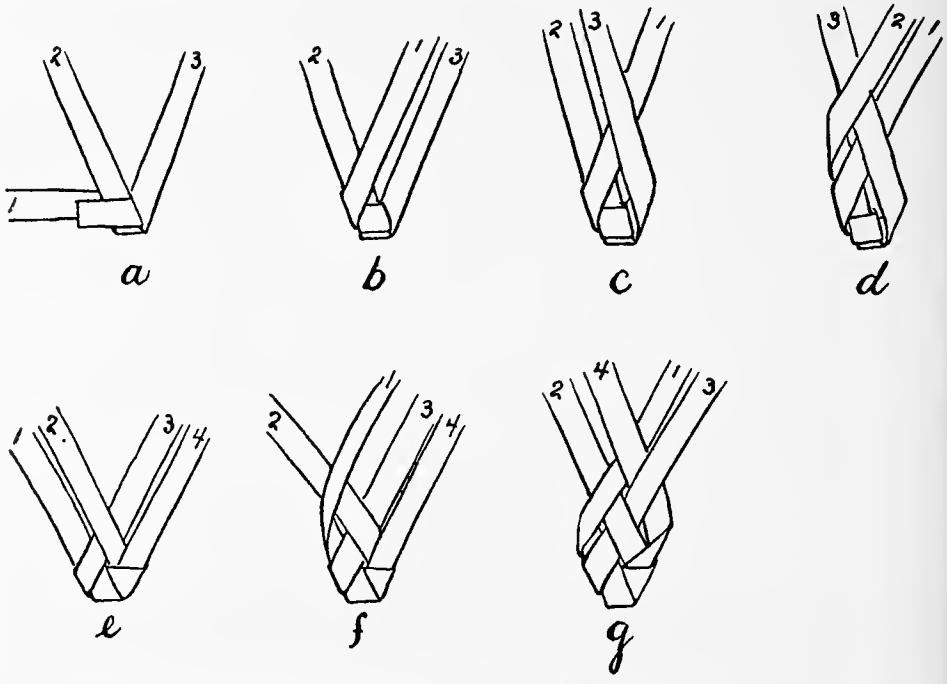


FIGURE 43.—Technique of making hat braids—folding the edges: *a-d*, of a three-ply *titona* braid, fold 1 and 3 and 2 in turn, always towards worker; *e-g*, of a four-ply *titona* braid, fold 1 on the left edge towards worker and 4 on right edge away from worker.

It is when they use the horizontal twilled stroke that the Tahitians develop the greatest variety of patterns (Pl. XIII, *B*). They use a constant combination of strokes for the edges of all *manua* of horizontal twills, always folding the working ply around its neighbor and over the two adjacent ply before starting the distinguishing stroke by passing it under the proper number of raised ply. Because of the straight edges, they must fill in triangular spaces on either side of the central bands of

regular horizontal twills, to accomplish which they pass each working sinistral under a diminishing number of raised dextrals on the right edge and each working dextral under a diminishing number of raised sinistrals on the left, before crossing them according to the scheme of twill strokes chosen for the braid.

The *manua* pattern of this style known as *ara iri* (Pl. XIII, *B*, *c*), which employs twilled-fives, will serve as illustration of the method:

The working sinistral, after the regular edge strokes, begins its diminishing series by passing under 9 dextrals before it is ready to cross over 5 and under 5 dextrals in the twill strokes. On the other edge, the working dextral is at this point in the midst of its diminishing series, it being necessary for it to cross under but 3 sinistrals before it crosses over and under the regular 5 sinistrals of the twill stroke. On the next stroke, the working sinistral passes under 7 dextrals in preparation for the twilled-fives; the working dextral, under 1 sinistral. The next sinistral passes under 5 dextrals in preparation; the next dextral, beginning its new series, under 9 sinistrals. Thus the series continues: the next sinistral, under 3 raised elements, the next dextral under 7; the next sinistral under 1, the next dextral under 5; the next sinistral beginning its new series under 9, the next dextral under 3 and so on.

These strokes may be described by chart (to be read from left to right in lines):

Dextrals						Sinistrals					
Around	Over	Under	Over	Under	Over	Around	Over	Under	Over	Under	Over
1	2	3	5	5	..	1	2	9	5	..	..
1	2	1	5	5	2	1	2	7	5	2	..
1	2	9	4	..	..	1	2	5	5	4	..
1	2	7	5	1	..	1	2	3	5	5	1
1	2	5	5	3	..	1	2	1	5	5	3
1	2	3	5	5	..	1	2	9	5	..	..

In such a pattern as that called *maramarama* (windows) (Pl. XIII, *B*, *f*), this technique is modified so that a horizontal twilled-two stroke alternates with each one of a series of ply numbering from one to six.

The following chart indicates this procedure:

Dextrals						Sinistrals					
Around	Over	Under	Over	Under	Over	Around	Over	Under	Over	Under	Over
1	2	3	2	3	..	1	2	6	4	..	..
1	2	1	2	6	..	1	2	5	5	..	..
1	2	9	..	..	..	1	2	4	6	..	..
1	2	9	..	..	..	1	2	3	6	1	..
1	2	7	2	..	..	1	2	2	5	2	1
1	2	5	2	2	..	1	2	1	5	1	3
1	2	3	2	3	..	1	2	6	4	..	..

Yet another manipulation of horizontal twilled strokes in a *manua* braid is illustrated by that called *e taiara ua* (snail's trail), where the sinistrals and dextrals, after the two usual edge strokes, are carried to the center and interwoven there in three strokes of horizontal twilled-threes (Pl. XIII, *B, g*).

As in the vertical twills, so also in many *manua* of horizontal twill patterns, ply of contrasting color are introduced for variety of design. It

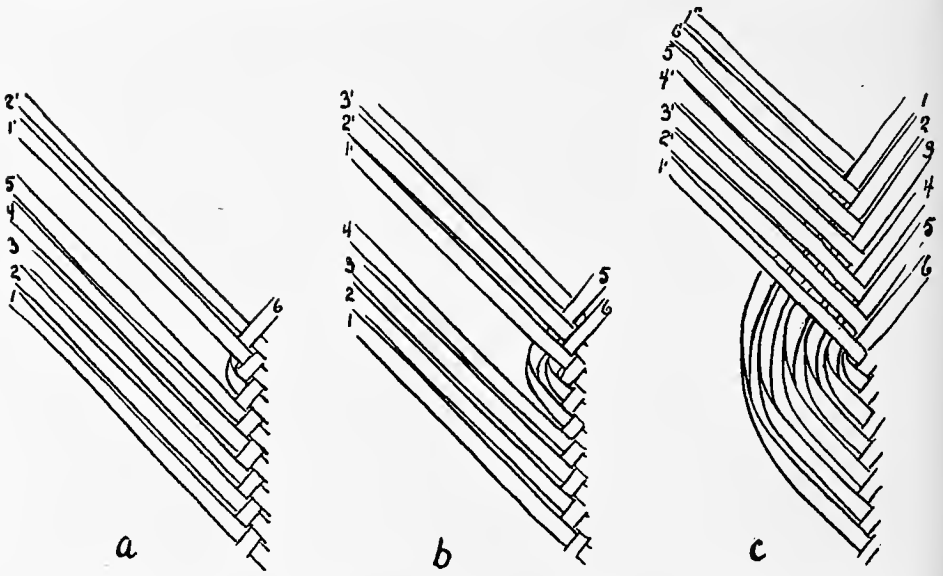


FIGURE 44.—Technique of making hat braids—*ope* edge: *a*, plait 8 sinistrals through from opposite edge, turn 6 about in a loose curve and plait it as a dextral over 2′; *b*, plait ninth sinistral through, numbered 3′, turn 5 about in a loose curve outside 6 and plait it as a dextral over 3′; *c*, continue thus, turning 4, 3, 2, and 1 in turn each outside the other, each time plaiting through a sinistral from opposite side, 4′, 5′, 6′, 1″, over which each dextral passes respectively before returning into pattern of the braid.

seems unnecessary to go into the procedure which evolves the still more complicated *manua*, where the strokes are manipulated with the design primarily in mind (Pls. XIII, *B, h, i;* XII, *C*). Suffice it to say that both vertical and horizontal twilled strokes of varying ply are employed.

A variety of edges transform these plaits of diamond check and twilled strokes into yet another series of braids, each type of edging adding its name to that of the braid itself. There are three other very common edge strokes; the *ope*, the *tara* (thorns), and the *puupuu* (protuberance).

The number of ply worked into a unit of the *ope* edge is at the discretion of the worker, any number from two to nine being usual

(Pl. XIII, *C, a, b, c*), and the *ope* is designated by this number—*piti* (two), *toru* (three), *maha* (four), etc.

When the left edge is chosen for this ornamental stroke, the sinistrals are not turned back as dextrals when they have been plaited through from the right, but are left hanging until they are of sufficient number for the chosen *ope*. For instance, if six ply are to be manipulated in the *ope* edge, six sinistrals are first plaited through from the right edge and left hanging, one after the other. When the next two sinistrals—the seventh and the eighth—have been plaited across, the sixth is then turned about, but without the usual sharp fold, and, after passing around the seventh crosses over the eighth and thereafter into the pattern of the braid (fig. 44, *a*). After the ninth sinistral is plaited across, the fifth hanging element follows a curve on the outside of the sixth and passes under both the seventh and the eighth sinistrals and over the ninth before being plaited into the pattern of the braid. Similarly, the fourth hanging sinistral curves around the sixth and fifth, under the seventh, eighth, and ninth and over the tenth, and so on (fig. 44, *b, c*).

The *ope* edge is put on any braid pattern, which is thereupon designated by its own name plus the *ope* and its number, as for example, *ara iri ope maha* or *taratara ope toru*. An open edge, usually of two ply, is frequently worked on narrow braids of two colors (Pl. XIII, *C, a*).

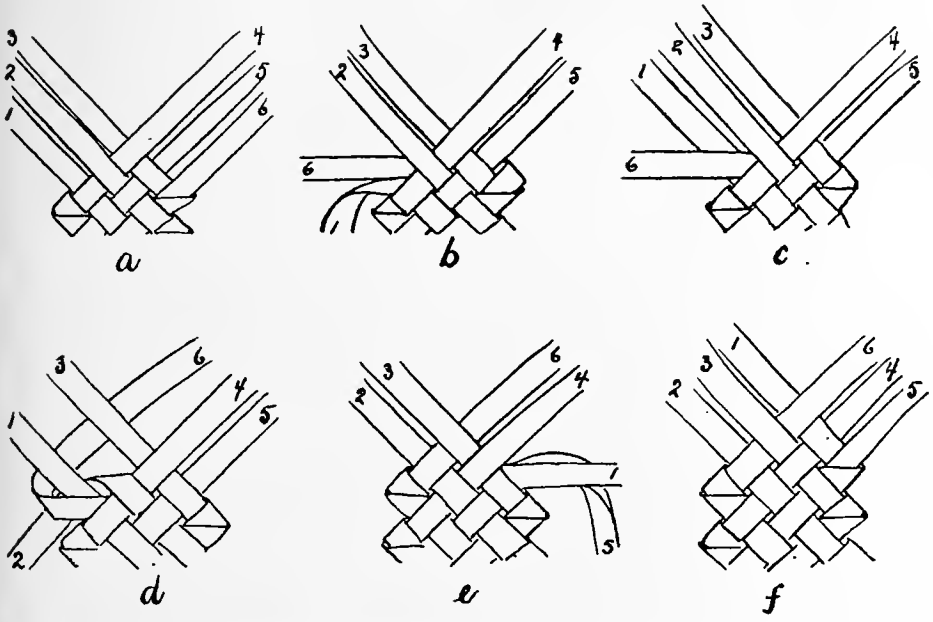


FIGURE 45.—Technique of making hat braids—the *tara* edge: *a, b, c,* press down 1 out of the way, fold 6 away from worker and lay it horizontally across wrong side of braid, passing it over 1; *d,* press 2 down out of the way, fold 6 again away from worker, around 1 and pass it across as dextral over 2 and under 3; *e,* press 5 down, fold 1 away from worker around 2 and 6, lay it horizontally across back of braid and let it fall over 5; *f,* press down 4, fold 1 around 5 and pass it across as a sinistral over 4 and under 6.

The *tara* (thorn) edge occasions the greatest change in the pattern of the braid. Though the right side follows the ordinary appearance of diamond checkerwork, the wrong side, because of the way in which the working ply is folded about a neighboring ply first on one side and then across on the other to make the pointed edges, gives the effect of a series of horizontal strokes. Designated according to the number of ply in the plait, the *tara* braids utilize an even number of elements—four, six, eight, etc. (Pl. XIII, *C, d, e*). As an indication of this method of manipulating the ply of a braid, a diagram of the making of a *tara ono* (of six ply) is given in figure 45.

The *puupuu* edge, as its name indicates, is characterized by a raised turn of the ply on the wrong side. In the simplest form of *puupuu* (Pl. XIII, *C, f*), when this edge is used on a *titona* braid, a single sinistral is turned twice about itself—first away from, then towards the worker—before being returned to the checker stroke of the braid as a new dextral.

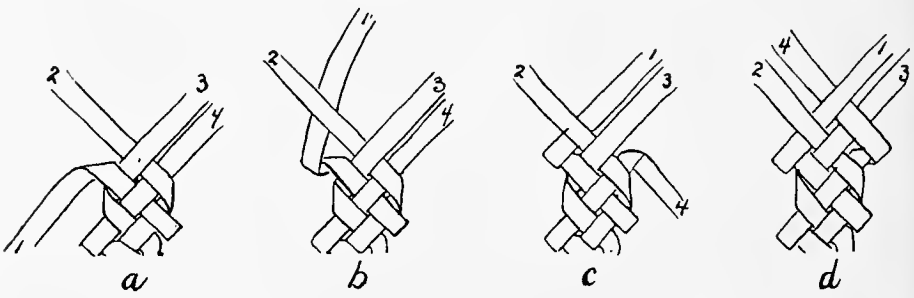


FIGURE 46.—Technique of making hat braids—*puupuu tara* edge: *a*, fold 1 away from worker; *b*, fold 1 again this time towards worker, and pass it under 2; *c*, fold 4 away from worker; *d*, fold 4 again, this time towards worker, and pass it over 3 and under 1.

When the *puupuu* edge is worked on both sides of a checkerwork braid, a kind of combination of the *tara* and *puupuu* edges results, as is diagrammed in figure 46. Then, furthermore, the *puupuu* edge is worked on a braid of vertical twills, a *puupuu piti* (of two ply) or a *puupuu toru* (of three ply) results, according to whether the twill strokes involve two or three ply. When two or three ply are twisted about one another so as to create points on the edge and a raised ply on the wrong side (Pl. XIII, *C, g, h, i*). When these points are sharp, the ply are manipulated as shown in figure 47, *a-c*; when they are blunt, the ply are twisted as in figure 47, *d-g*, or figure 47, *h-k*. As in all other patterns of Tahitian plaiting, the use of materials of two colors adds variety to the surface effect of the braids.

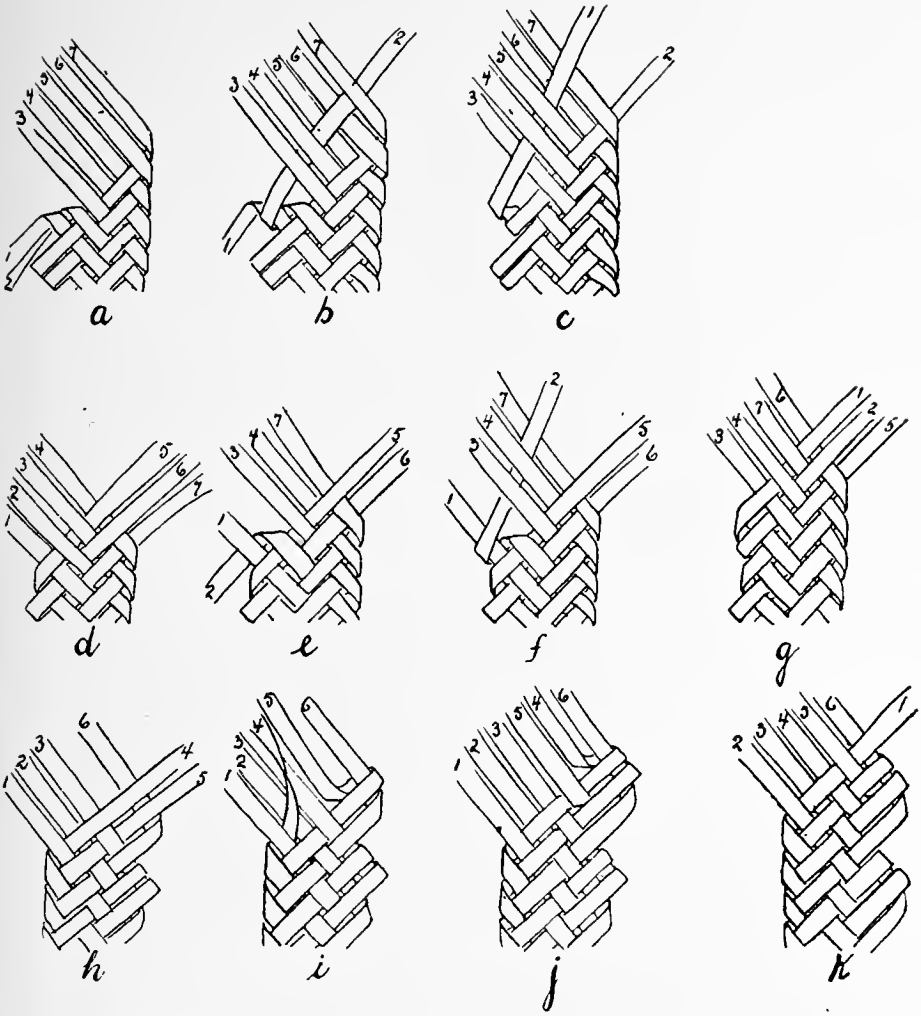


FIGURE 47.—Technique of making hat braids—*puupuu* edge on twilled braids: *a-c*, for a sharp-pointed edge, fold 1 and 2 away from worker, fold 2 again, this time towards worker and around 1, and pass it as dextral under 3 and 4, over 5 and 6 and under 7, fold 1 towards worker around itself, lay it parallel to 2, passing it over 3, under 4 and 5 and over 6 and 7; *d-g*, for a blunt-pointed edge, fold 2 away from worker, fold 7 towards worker and cross it as a sinistral over 6 and under 5, fold 2 towards worker and around 1, and cross it as dextral under 3 and 4, over 7, fold 6 towards worker and cross it as sinsitral over 5 and under 2, fold 1 towards worker and cross it as dextral over 3, under 4 and 7, over 6; *h-k*, for another blunt pointed edge, fold 6 away from worker, leaving width of two elements before the fold, fold 5 away from worker around 6, double it back on itself, fold it at right angles towards worker and lay it next to 3, fold 4 away from worker around 6, double it back under itself, fold it at right angles towards worker, so as to lie between 5 and 6, fold 1 away from worker and cross it as dextral under 2, over 3 and 4, under 5 and over 6.

Variety is gained in yet another way—by overlaid weaving, a contrasting color being introduced in some on the wrong side of a plain *titona* braid and definitely plaited in purely for design, not for any structural necessity (fig. 48). In some a straight strip of a contrasting color is imbricated on the wrong side of a *tara* braid, being simply threaded under the horizontal strokes.

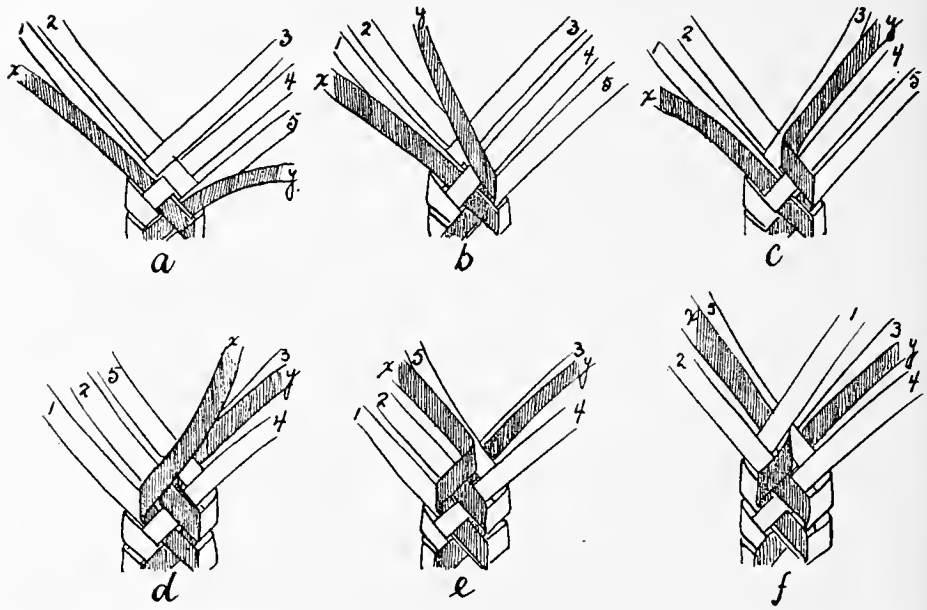


FIGURE 48.—Technique of making hat braids—overlaid plaiting: *a*, lay colored elements, *x* and *y*, on top of 1 and 5 respectively; *b*, fold *y* towards worker on line of direction of 2; *c*, fold *y* again, this time away from worker, and lay it on top of 3; *d*, fold 5 away from worker and cross it as sinistral under 4 and over 3 and *y*, fold *x* towards worker and lay it on line of direction of 3 and *y*; *e*, fold *x* again, this time away from worker, and lay it on top of 5; *f*, fold 1 away from worker and cross it as dextral under 2 and over 5 and *x*.

There is no intention in this paper to cover the myriad varieties of patterns and designs in modern hat braids, but merely to indicate the principles of plaiting for decoration which, it seems likely, were known to the ancient Tahitians and employed by them in the manufacture of other articles.

SANDAL WEAVING

Here and there, fishermen still make sandals (*tiaa*) of purau bark to wear when fishing on the coral reefs, and, in late years the manufacture has also been revived for the sake of completing costumes made

to compete for prizes offered at the celebration of the Fourteenth of July. Two different methods are employed in the making of sandals, both apparently representing an approach to hand weaving, even including the use of a rudimentary loom. Ellis says [15] that "when fishing on the reefs, they often wear a kind of sandal, made of closely netted cords of the bark of the native *auti,* or cloth-plant." There is no trace today of such a process as "netting" sandals, nor of such a material for their manufacture as *auti.*

The coarser type of sandal manufactured today is made of the rough strips of the inner bark of the purau tree just as they are stripped from the stick without being shredded into fine combings. The right foot and knee act as the two "beams" of the most simple kind of "loom," around which the passive warps are wound.

The young man of Maupiti, who made this form of sandal for me, knelt upon his left knee, placed a strip of bark about 64 inches long under the sole of his right foot at a point a little more than midway of its length, and looped it up around his right knee. Tying the loop tightly, so that one end of the strip hung out longer than the other, he was equipped with two passive warps held taut by foot and knee. Another long strip of bark which was to act as a continuous weft woven back and forth, he tied to the right hand warp just above his foot. Folding the length of the weft into a wad conveniently held in his right hand, he wove it between the two warps working up towards his knee in the following manner (Pl. XIV, *A*): He carried the weft over and around the left warp and back so as to cross over itself. As he crossed to the right, he carried the weft over and around the right warp and, returning to the left, passed it over itself (fig. 49, *a*). Continuing this procedure, he made a sole of sufficient size—8 inches in length and the width of his foot—it not being considered necessary to weave enough to protect the toes.

This small mat tightly woven, with the strokes shoved closely together, he reinforced by threading the end of the weft in and out, vertically, from the heel end, where he completed it, to the toe end and back again, knotting it firmly at the heel end to the last two or three weft crossings. Untying the warp element at his knee, he used the shorter end again to reinforce the sole, threading it also in and out from heel to toe and back and tying it, too, about the final crossing wefts (Pl. XV, *A*).

The sole complete, he equipped the sandal with ties. The long end of the original loop of the warp, which had been left hanging at the right hand corner of the heel, was now ready for use as a tie; and he made a mate for it by tying another strip of bark to the left hand corner of the heel. His next move was to equip the sandal with eyelets along the sides of the sole, through which the ties might be threaded. He made these with another strip of bark tied to the left hand corner of the toe end and carried first along the left side of the sole in a series of loops knotted at intervals to the left hand warp element and then, similarly, along the right hand side after crossing back and forth at the heel end in the regular weaving stroke (fig. 49, *b*). The end of this strip he made fast by threading it through the fabric of the sole from toe to heel and knotting it about its own crossing just laid down.

[15] Ellis, William, Polynesian researches, 2nd ed., vol. 1, p. 143, London, 1831.

He completed the sandal in a few minutes and put it on in order to demonstrate the method of tying it.

Crossing the tying strings at the back of his heel, he brought them forward and threaded them through the loop in the warp element which had been left at the toe end (fig. 49, *c*). When he had pulled them tight, so that the toe loop lay between his toes, he threaded the ties through the side eyelets, crossing from side to side (49, *d*, *e*), and finally tied the ends together back of the ankle.

A similar technique is used on the island of Moorea in the making of sandals, yet diverse enough for a separate recording. It was not possible

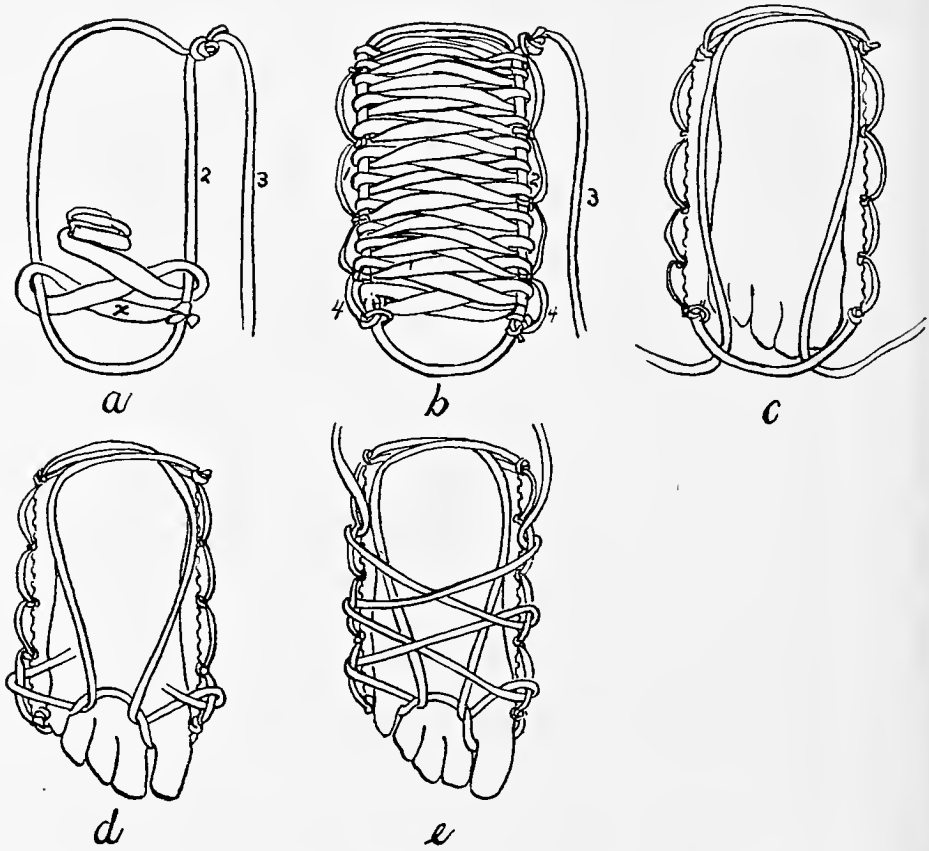


FIGURE 49.—Technique of sandal-making—a rough form from Maupiti, with one crossing weft; *a*, tie a loop in strip of more bark, making two warps, 1 and 2, and leaving a free end, 3, tie a weft, *x*, to 2 and weave it back and forth between 2 and 1, over, around, under 1, over itself, over, around, under 2, over itself, etc.; *b*, tie another strip of more bark, 4, to 1 at intervals to form eyelets, weave it back and forth between 1 and 2 at heel, and tie it to 2 at intervals for eyelets; *c-e*, method of lacing sandal.

to see the process of this manufacture, but the finished article reveals its peculiarities (Pl. XV, *B*).

For this sandal, two transverse wefts were simultaneously interwoven between the two warps (fig. 50, *a*). These were tied one on either strand of the warp loop, about 9 inches from the turn, and, after interweaving, were tied together at the end of the sole. Furthermore, in starting, each transverse weft was tied about 10 inches from one end, so that, when its greater length had been worked into the sole, its shorter end hanging free was used to make the eyelets along its side of the sole. Both ends of the original loop which formed the warp when untied became the ties for the sandal. These ends, however, were stripped into three ribbons each and plaited into a three-ply cord. There was no reinforcing of the sole by turning the wefts into verticals and threading them across the fabric, probably because the use of two crossing wefts, instead of one, made a more durable sole.

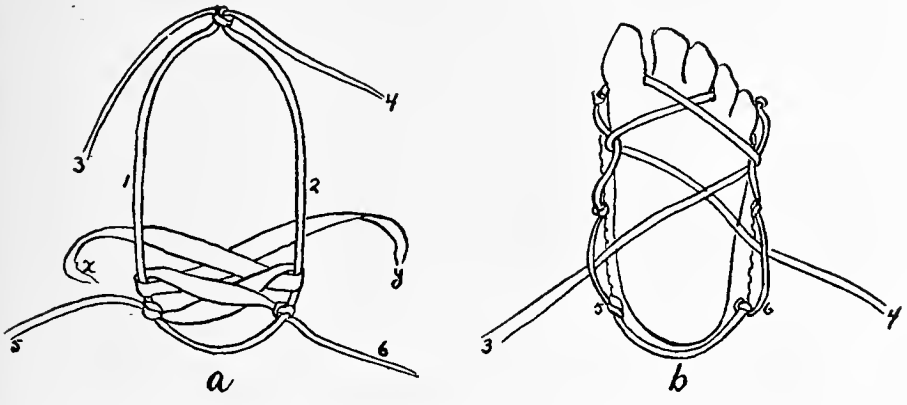


FIGURE 50.—Technique of sandal-making—a form from Moorea, with two crossing wefts: *a*, tie a loop in strip of more bark so as to make two warps, 1 and 2, and to leave two free ends, 3 and 4, tie a strip of more bark, *x*, to 1 leaving 5 hanging free, tie a similar strip, *y*, to 2, leaving 6 hanging free, interweave *x* and *y* between 1 and 2; *b*, tie 5 at intervals along 1, and 6 along 2 to form eyelets, use 3 and 4 as laces as shown.

The lacing of the sandal also differed from that of the other.

The loop in the warp was used not between the toes, but around the heel, and the laces started from the corners at the toe end of the sandal. These were crossed and pulled between the toes before being laced from side to side through the eyelets (fig. 50, *b*) and tied together behind the heel.

A finer and more durable sandal (Pl. XV, *C*) is manufactured on Maupiti in a manner, which, it seems to me, may legitimately be called weaving. The native designation for this technique is *haune,* the same word as that applied to matting. Teraitua, a learned old man of Maupiti, took great pains in making for me a pair of sandals of this type, which he calls *tiaa no te tautai* (fishermen's sandals). He prepared two long cords of purau bark for each sandal, stripping the inner, treated bark into

fine threads and twisting them (*nino*) into hard cords by rubbing two strands together on his thigh. Constructing a rude loom of two sticks, each about a foot long, he held them about 9 inches apart, one on the ground, each end caught and held between a big toe and its neighbor, the other in his left hand (Pl. XIV, *B*).

With these sticks acting as "beams," he tied a cord to the right end of the stick held in his hand and then proceeded to wind it from right to left around the two sticks, each time passing this warp under, around and over the stick before crossing to the opposite one. When he had thus "beamed" the cord and tied it at the other end of the upper stick, he was equipped with twelve warps stretched between the two "beams." Each crossing warp he called an *au taravarava,* and the continuous transverse weft, which he next introduced, he referred to as *au tarava.* Both ends of the weft he threaded through the loops of the warp, one from either side, so that they lay along the bottom stick and crossed each other in the middle. Instead of drawing this loop in the weft tight, he left it hanging for a few inches to act later as a loop for the toes (fig. 51, *a*).

Because of the manner in which he had wound the warp about the sticks, it was a simple matter to "shed" or separate them into two layers (*taravarava i nia,* upper warp, and *taravarava i raro,* lower warp), by slipping his right hand into the warp loops close to the upper stick and pressing it down towards the bottom stick. Thereupon, he threaded (*puhono te tarava* or *oomo te tarava*) the weft element through from either side (fig. 51, *b*), shoved the two crossings down against the lower stick and pulled them tight from either side.

After this first "shedding" or separating of the warps for the weft to pass through from either side, it was necessary to withdraw the upper stick from the warp loops (fig. 51, *c*) and turn them by hand in order to exchange the two layers of warp.

Working from right to left, he twisted each loop a half turn towards the left, and folded the ends of the warp cord, which had been tied to the upper stick, down over the transverse wefts (fig. 51, *d*). After this preparation, in threading the wefts through from either side, they crossed over the hanging warps at either side and bound them in. In preparation for the next "shooting" of the weft, he twisted each warp loop a half turn towards the right and folded the hanging warps up over the weft ends. Thus, he wove a double weft through every shed made in the warp and at the same time bound in the loose warp ends on either side, crossing alternately over and under them.

When the work had progressed almost to completion, he withdrew the bottom stick and shoved the fabric down to fill its place. After making the last possible turn in the warp loops, he threaded through with the final crossings of the wefts the loose warp ends which he had bound in along the sides of the sandal and cut them off short on the opposite sides after pulling the weave tight over the four wefts included in the last "shed."

A single eyelet (*pu taria*) at the middle point of each side of the sandal he made by pulling out a weft where it turned about to recross the warps

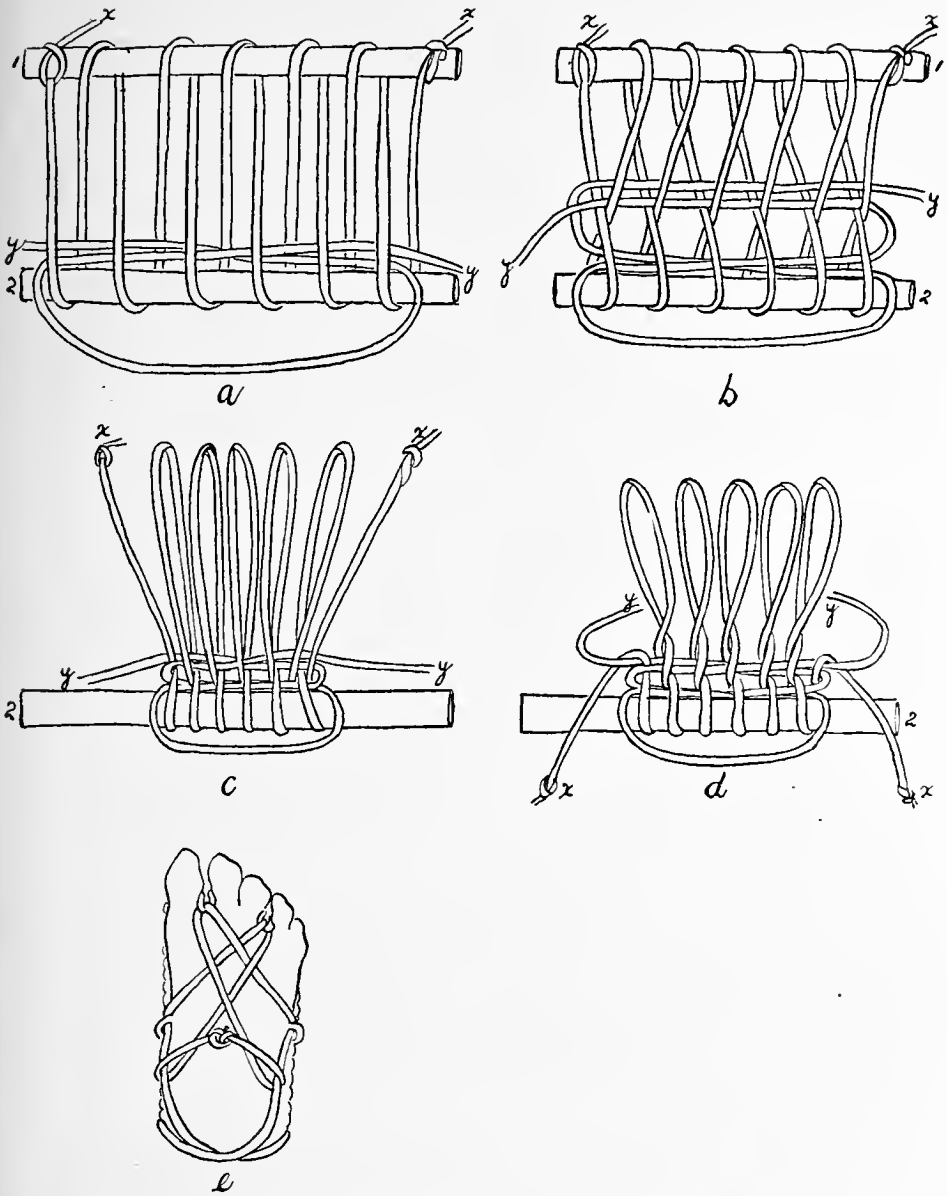


FIGURE 51.—Technique of sandal-making—a woven form from Maupiti: *a*, wind or "beam" long warp element of more bark, *x*, on two sticks, 1 and 2, thread weft, *y*, through loops from either side, leaving loop hanging over stick, 2; *b*, "shed" or separate warps and thread *y* through from either side; *c*, remove stick 1, draw wefts tight; *d*, twist warp loops by hand, ready to thread wefts through again, and so on; *e*, method of lacing this sandal.

at either side. The ends of the wefts, which hung from the final corners of the sole, he explained were to be used as ties (*taui*) fastened at the heel end. Setting his foot on the newly made sole, he began to illustrate the method of tying the sandal.

He crossed the *taui* behind his ankle, threaded them through the side eyelets, crossed them again over his instep, threaded them through the loop left at the toe end in two places, between the big and second toes and the little and fourth toes, again crossed them over the instep, looped each around its own length alongside the heel and back of the eyelets, and brought them forward again to tie in front of the ankle (fig. 51, *e*).

This interweaving of the ties he called the *tafifi* of the *tiaa* or sandal.

CORD, ROPE, AND NET WORK

PREPARATION AND USE OF MATERIALS

Coconut Fiber

No material used for cords has such a grand old tradition as coconut fiber (*puru haari* or *pururu*). Its strength and durability have impressed visitors from the time of Wallace to the present day. Those fortunate enough to have seen it holding its proper place in the material culture of the islands could observe its varied uses as there is no opportunity of doing today.

Both the preparation and the manufacture of this material has always been the work of men. They select coconuts known as *omoto*, a term referring to that stage of growth where the meat of the nut is about half an inch thick. They split (*e ō*) the husks from the hard inner shells of the nuts, dextrously jambing them down upon the pointed end of a stick planted solidly in the ground, and rip off the outer covering in segments. Tying these sections of husk in bunches and fastening them conveniently to the shore, they leave them to soak in the sea for two months. Thus softened, the worker undertakes to beat them into shreds. Holding a piece of husk in his left hand and swinging the heavy stone pounder known as a *penu* in his right, he beats the soaking mass until it is dry and the tough fibers separate. He then picks up a bunch of loose fibers in his left hand and combs the tangled mass with his fingers. The small combings he saves for making the twisted cord known as *anave*; the long strong fibers he ties in bundles to be plaited into *nape*.

Many recollections of ancient uses of coconut fiber give no clue to the type of cord used—the twisted *anave* or the plaited *nape*. There is, for instance, the elaborate headdress of the warrior which was so distinctive a feature of his costume. Teraitua of Maupiti described it to me as consisting of a high crown or framework of strips of the wood of the tutu (*Colubrina asiatica* Rhamn) bent into semicircles and bound across one another, with a covering of coconut fiber (whether netted or plaited is unknown) which formed a foundation for the ornamentation of feathers of the tavai bird. This is probably the helmet variously designated by early visitors as *fau, whow,* and *parai*.[16] It is possible today only to guess at the wide range of uses to which this unequalled material was put; but it is certain that it lent itself to the very finest and most ornamental cord work, as well as to the coarsest and strongest.

[16] Ellis, William, Polynesian researches, 2nd ed., vol. 1, pp. 299-300, London, 1831; Moerenhout, J. A., Voyages aux Iles du Grand Ocean, vol. 2, p. 34; Corney, The quest and occupation of Tahiti by emissaries of Spain, vol. 2, pp. 270-71.

The small *too* (god-sticks) which I have seen are covered with sheaths netted from fine, twisted cord of coconut fiber,[17] as are also the remnants of netted fabric found in burial caves. I have been told that in the old days when nets for carrying and hanging gourds (*toto*) were made, they were netted of *anave puru haari.* Edge-Partington and Heape depict a reinforced cord of three strands of "twisted sinnet" wrapped together with human hair.

On the other hand, the three-ply plaits of the long, strong fibers (*nape*) are used for lashings where there is strain—for holding an outrigger in place on a canoe, for example. It is probable, also, that, since the broad flat plaits lay better in a braid or lashing where the design was conspicuous, *nape* was used for decorative purposes such as the beautifying of the *vivo* (bamboo flute), the quiver for arrows, and the old archery bow, mentioned by Ellis [19]. There is in the Peabody Museum a military demi-gorget of broad braids of plaited *nape,* a similar one being pictured by Corney[20] which is in the British Museum.

Purau Bark

The most commonly used material in the manufacture of cords and ropes is the bark of the purau tree. When something is to be tied, from a bundle to a canoe, a native turns instinctively to a purau tree. He may peel off a strip of the outer bark and use it as it comes from the tree, not even waiting to dry it. He may simply dry it and plait it or twist it into rope without other preparation. Or he may prepare *more* from the inner bark (p. 8) and manufacture smooth, well made cords and ropes.

The cords called *anave more,* that is, of twisted strands, are considered proper for lashing the rafters of a house; and are used as well in the manufacture of the carefully made, woven sandal, and as the element on which to hang fringes for skirts or house decorations. Ellis reports that nets for the *operu* (herrings) were made of twisted bark of the *hau* and Corney likewise mentions fishing nets of fau bark; but at present *more* is tied into nets only in the making of sacklike nets for carrying oranges, and in the fabrication of a certain form of dance costume, for which it is neither twisted nor plaited but used rough.

The *more* is made into plaited cords to serve as handles for the satchel form of basket; and it is plaited three and four ply in varying weights for use as stays on canoes, and as tether ropes for pigs and horses.

[17] Ellis, William, Polynesian researches, vol. 1, p. 337. London, 1831.
[18] Op. cit., vol. 1, p. 300.
[19] Op. cit., pp. 218-220.
[20] Corney, B. G., The quest and occupation of Tahiti by emissaries of Spain, vol. 2, p. 270, 1914.

Piripiri Bark

The finest cords, fringes and tassels for costumes and fans are made of the inner bark of the piripiri plant. Tahitians take great delight in fine materials and these soft, white, flaxlike fibers are prepared with especial care and pleasure. As with the purau tree, March, April, and May are the months in which piripiri shoots are cut, when the stems are about ¾ inch in diamter. The sticks are buried in mud at the river's edge and left for 10 or 15 days, until they become slimy and malodorous, when they are dug up, the outer skin slips off quite easily. A thorough cleansing of the inner fibers is accomplished by tying them together at one end and floating them in the swift current of the river. When the running water has done its work, the fibers are removed and combed into fine, white threads, soft and silky.

Roa Bark

The fine, strong, twisted cord formerly most prized for fish lines and nets was made of the fibers of the roa shrub (*Urtica argentea*).

In the old days, the preparation for the making of *anave roa* (twisted *roa* cord) was begun in October, cutting down the roa bushes at that time, so that new shoots might spring up and be ready for the cutting the following July. In July, then, might have been seen the young, green sticks of *roa* heaped under a purau tree on the beach perhaps, ready for the stripping which was to leave them clean and greenish after the removal of the outer skin. For several nights they were spread upon the grass in the dew, soaking and bleaching to snowy whiteness. And finally came the combing of the fibers into fine threads with the aid of a thorn from an orange tree, a painstaking but sociable occupation. Such were the roa fibers which were twisted by the process known as *nino* into cords for fish lines and nets.

Other Materials

There is mention by Tati [20] of beating aitu reeds for fish lines, but I was not able to ascertain any present knowledge of such a process or plant.

It is said that formerly the fibers of the stalk of the mountain banana called *fei* were used for rough cords for binding and tying, and there is a tradition that banana fiber was once separated into threads and used for making string figures in play.

Ellis reports the use of twisted cords of "the tough white bark of the *mate*" to tie the meshes of nets to catch the ava fish.

[20] Salmon, Tati, The History of Borabora, manuscript in Bishop Museum.

It is known that human hair was finely braided and wound round and round the head in turban form in the ancient days of Tahitian culture, but nothing of the method of preparing or of braiding the material has been preserved even in memory. Ellis speaks of such a headdress, called *tamau,* as containing 100 fathoms of braid; while Banks says he has seen these braids "plaited scarcely thicker than common thread, in pieces above a mile in length, worked on end without a single knot." Wilson adds the information that these braids were of six or nine hairs in thickness, and that some girdles were also plaited of human hair.

PROCESSES

Cord Making

The honor of making cords, ropes and nets, still belongs to the men folk of the Society Islands, whenever they care to avail themselves of the privilege. The manufacture of some cord still involves the use of several materials—coconut fiber, and the barks of the purau, piripiri, and mulberry trees—but inasmuch as an "odor of sanctity" hangs about the use of the coconut fiber, more of the traditional method of manufacture persists in its use. The chief of Maupiti gave me a very complete demonstration of this time honored industry.

He sorted out the soft combings from the fibers beaten from the coconut husks, with the intention of making first a twisted two-ply cord, an *anave* of two *ave* (strands). He used the method common throughout Polynesia, twisting the fibers together by rubbing them between his hand and his thigh. The process included the continual lengthening of each strand by rubbing together short overlapping fibers, and the twisting together of the two ply. Laying the fibers across his naked right thigh in two parallel strands he held them apart with his left hand, while he pressed the palm of his right hand down and rubbed first the near ply, then the far ply, across his thigh in the following way. He drew the near ply towards him and pushed it away with a smooth, flowing movement. He rubbed the far ply towards him, then away from him, and then, without interruption of the smooth stroke, rubbed it again towards him, carrying it this time over the near ply and rubbing the two towards him together. Just as a loose twist was beginning to form in the two ply, he reversed his movement and rubbed the two together away from him down his thigh all the way to the knee.

Lifting up the section thus manipulated, he exhibited a firmly twisted two-ply cord, the common form of *anave puru haari.* A three-ply cord of coconut fiber is now uncommonly made.

Having used up the pile of combings in twisted cord, the chief turned with satisfaction to the longer, stronger fibers, of which plaited cord is made. It was clear that he followed a method prescribed from generation to generation, as he gathered up a thick bundle of fibers, which had been

tied in the middle for orderly keeping, and placed one end of it under his left thigh as he sat on a stool. His weight kept the bunch in place, so that he could pull out two or three fibers at a time without disturbing the others. In such small installments he pulled them out with his right hand and placed them crosswise in his mouth, the ends hanging from either side. It seemed to be the sense of bulk between his lips which advised him when he had selected enough fibers for the plait.

Holding the ends, then, in his mouth, he started a three-ply plait of the ordinary style, adding fibers as they were needed, always transferring them from the bunch under his leg to his mouth before working them in. When the plait was long enough, he tied one end to the end of a three-foot stick, indicating, however, that it was also permissible to tie it to his big toe. The stick method he preferred, for, shoving the free end under his right thigh to hold it firmly, he used it both as a stationary anchor for his work and, soon, as a spool on which to wind it as he finished the plait. This he accomplished by plaiting towards him for the length of the stick, then by pulling the finished plait tightly over the near end of the stick and turning it about so as to plait it again towards him along its length. Thus he wound length after length from end to end about his stick. When he had manufactured as much *nape* as he desired, he withdrew the stick very carefully, so as not to disturb the wound plait, and secured it by wrapping the bundle from end to end with the loose end of the plaited cord.

The tight, cigar-shaped bundle, in which form *nape* is usually kept, was thus secured.

Rope Making

People are too much hurried in modern times—even in the Society Islands—to spend much time plaiting ropes (*taura*). The machine made article, or, in lieu of that, a rough strip of the outer bark of the purau tree peeled off and often not even dried, are today good enough for any son of an ancient master craftsman.

When the inner bark of the purau tree is used for ropes today, it is rarely neatly plaited. For three-ply rope (*taura firi toru*) a strand of *more* is tied to a post, a second is doubled about it, and the regular plaiting of three-ply, towards the worker, is begun, the outside ply being folded alternately over the central ply. The direction of the movement is reversed in four-ply rope (*taura firi maha*), the outside ply being folded under their respective adjacent ply. There is no attempt today to make other varieties of rope, though sometimes different names are given to these forms: *firi parahauhau,* to three-ply rope on the island of Borabora; and *firi momoa,* to four-ply.

Netting

Though netting, generally called *papai,* is at a pitifully low ebb today, two ancient methods are preserved in the manufacture of a few fish nets (*upea*) here and there, and of carrying nets.

FISH NETS

There is confusion everywhere as to the names of the only two tools required for netting—the needle and gauge, each being referred to at times as *au ta upea.* Netting needles on most of the islands of the group vary in size, but immaterially in form (figs. 52, *a, b*). Usually constructed of a strip of bamboo, from ¾ to 1¼ inches wide and from 9 to 18 inches long, they are bluntly pointed at one end, with a square notch cut in the other end. The eye, with its central tongue, near the point varies in length with the length of the needle. The cord is wound on the needle from end to end, being held in the notch at one end and caught around the tongue in the eye at the other end (fig. 52, *a*). There is employed on Huahine a netting needle of polished *toa* of a different style (fig. 52, *c*).

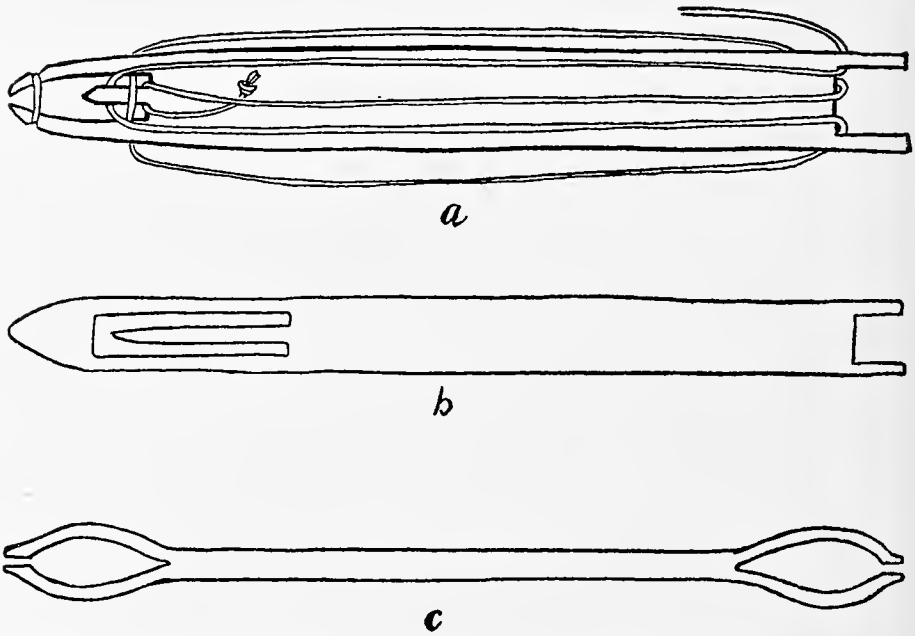


FIGURE 52.—Netting needles: *a*, a common form of needle of bamboo showing method of winding cord; *b*, slightly different form of bamboo needle; *c*, form from Huahine made of *toa.*

The other tool, the gauge, is a strip of bamboo 3 or 4 inches long and of a width equal to half the length of the desired mesh. When a gauge is used on which to wind the foundation loops of the net, its width is equal to the length of mesh desired.

The two methods of tying a net which are still preserved are known as *papai faataa* and *papai patia piti.* The *papai faataa,* being still employed on Maupiti, is clear cut enough to retain some of its technical terminology in the native vocabulary. The man whom I watched making an *upea* told me that there are two ways of starting the *papai faataa.* It is possible to stretch a cord (*haamata raa,* beginning cord) between two posts, and, moving from left to right, wind around it as many loops as will be needed for the width of the net, perhaps 40 or 60 elements. This, I gathered, he considered a slipshod method, for he swept it aside and used the more substantial beginning.

After measuring off a length of the two-ply cord, he tied it at its middle point around the gauge and knotted it on its upper edge. Turning the other edge of the gauge uppermost, he brought the cords up on either side and tied them together on this edge (fig. 53, *a*). Turning the gauge with first one edge and then the other uppermost, he continued to tie the foundation loops (*tue*) about it, until he had made enough for the width of the net (fig. 53, *b*). It was at this stage that he tied the beginning cord between two posts and strung the loops just tied about the gauge on it, slipping them carefully off the bamboo and threading them on the other cord . When he had pulled all the loops around so that their knots lay on their sides (fig. 53, *c*), he was ready to proceed from left to right with the making of the mesh. Each row of mesh he worked in this direction, turning the work over as he finished a row in order to continue with the same cord, always in the same direction.

Holding the narrower gauge in front of the working cord, with its upper edge at the bottom of the first foundation loop, he drew the cord around the gauge and pulled a loop of it (fig. 53, *d*) towards him through the first foundation loop on the left. Thereupon, he threaded the cord towards him through the loop of itself just made (fig. 53, *e*). At this point he shifted the form of the knot by pulling on the working cord before it entered the knot (fig. 53, *f*). With the end of the cord thus freed, he threaded it down into its own loop (fig. 53, *g*) and completed the first mesh of the second row by drawing the knot tight (fig. 53, *h*). Preparatory to tying the working cord in similar fashion to the next foundation loop, he pulled the free end around back of the gauge and up its near face (fig. 53, *i*). When he had tied the cord to the bottom of every foundation loop in this manner, he turned the work over and proceeded as before along the next row of mesh from left to right. Thus he continued, row upon row, to the desired length of the *upea.*

The second method of netting is known as *papai patia piti* (*patia,* to pierce or enter the mesh; *piti,* two).

After stringing the foundation loops upon the starting cord, the gauge is held as in the other method and the working cord brought down its back and up its front, that is, towards the worker. The tying of the knot, however, differs. The working cord is threaded into the foundation loop away from the worker

FIGURE 53.—Processes of tying fish nets—*papai faataa*: *a*, tie a cord at its middle point around a gauge, so as to have two working ends; *b*, tie cords together on edge of gauge, turn gauge, tie them together on opposite edge, and so on; *c*, slip loops off gauge and thread them on foundation cord, turning knots to middle of loops; *d*, hold narrow gauge with its upper edge touching bottom of foundation loops, pull working cord down behind gauge and up in front of it, pull a loop of the cord through first foundation loop; *e*, thread cord through its own loop just made, towards worker; *f*, change form of knot by pulling on working cord before it enters foundation loop; *g*, thread cord through its own loop, away from worker; *h*, pull knot tight; *i*, carry free end of cord down back of gauge and up in front, pulling loop of it through next foundation loop, and so on.

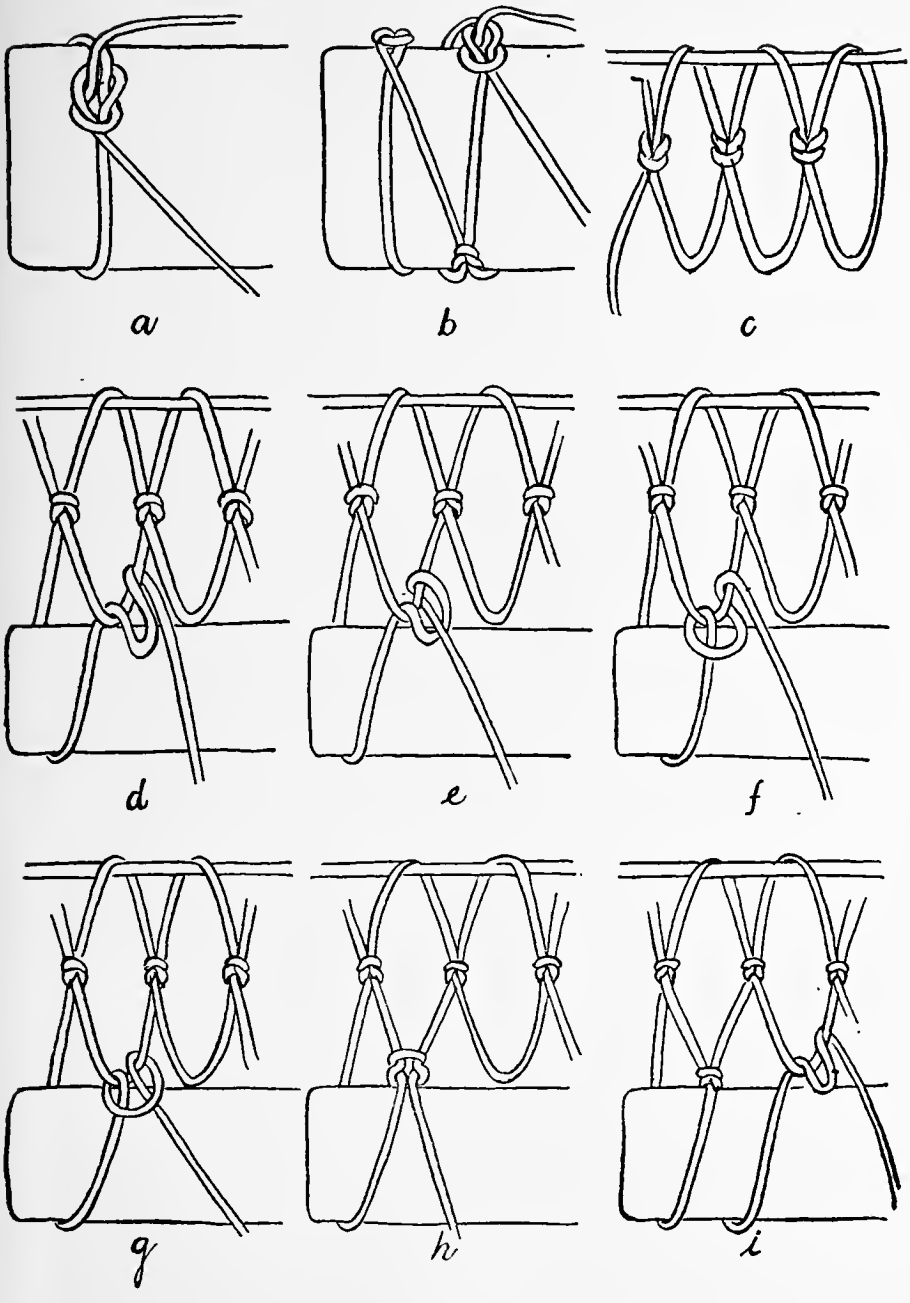


FIGURE 53

(fig. 54, *a*), then carried towards the worker and across both sides of the foundation loop on the near side, around back of both, and then threaded towards the worker into the circle of cord just made (*patia faahou*, pierce again) (fig. 54, *b*). When pulled tight (*mau*) (fig. 54, *c*), the first mesh of the second row is complete, and the netting continues according to this method.

CARRYING NETS

There are accounts of elaborate nets of twisted cords of coconut fiber and of purau bark that were once tied about coconut shells and gourds, by which to carry and hang them; but today, only the name (*toto*) and a long, simple net for carrying oranges remain to represent this form of netting (Pl. XVI, *B*). On Maupiti, a few names of parts of the old form of net are remembered: *tofe,* for the bottom of the sacklike net; *toto,* for the main body of the mesh; and *here tau* for the hangers.

It is possible almost daily to see young men making *toto anani* (orange nets) in those districts where the best oranges grow, for they bring the fruit encased in these nets to sell in the Papeete markets. It was in Paea on Tahiti that I watched the method of manufacture closely (Pl. XVI, *A*). The young Tahitian brought a pile of fresh, damp strips of the inner bark of the purau tree, each piece a little more than a yard long, and stripped them with this thumb nail into narrow ribbons about ¼ inch wide.

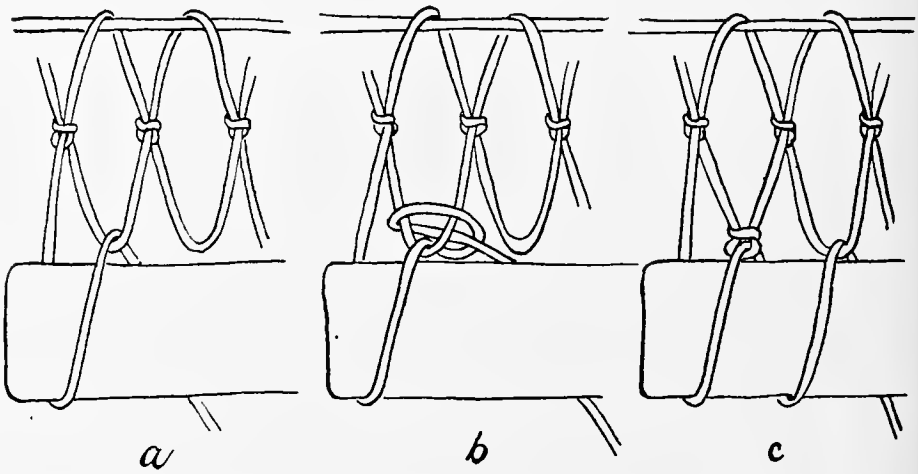


FIGURE 54.—Technique of tying fish nets—*papai patia piti: a,* string foundation loops on a cord, place gauge just below them, pull working cord down back of gauge and up its near side, thread it into first foundation loop away from worker; *b,* cross working cord over both cords of foundation loop on their near side, then cross it under both cords of foundation loop on far side and thread it through its own loop towards worker; *c,* pull knot tight, carry working cord down far side of gauge, up near side and thread it into next foundation loop, away from worker.

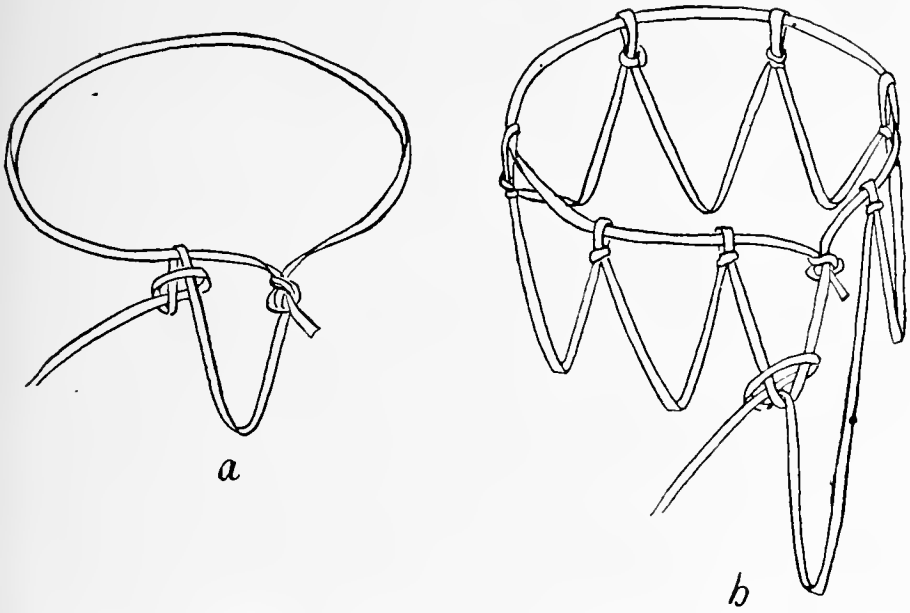


FIGURE 55.—Technique of making *toto: a*, tie a loop four inches in diameter in end of a strip of *more*, leaving one end of strip to act as working cord, carry working cord over loop and tie it about it with a slip knot; *b*, having tied working cord to the loop at intervals so as to form seven triangular loops around it, thread working cord into first foundation loop, away from worker, and tie it as shown, so as to start second row of mesh.

Doubling one of these, he tied a loop in it which took up about 12 inches of its length and left a long free end which he used as the working cord for the foundation loops. Catching the large loop over the big toe of his right foot, he began to form the small foundation loops along it. Inasmuch as the large loop was eventually to act as the drawstring of the mouth of the net bag, all the knots with which he fastened the foundation loops of the mesh about it were slip knots (fig. 55, *a*). His eye was the only gauge in determining the size of the mesh; his left little finger acting as a kind of peg which caught and held the working strip at the proper distance to form the desired mesh. He worked the foundation loops as well as the body of the mesh always from right to left—though it is sometimes worked in the opposite direction—and when he had tied seven slip knots, making six triangular loops, to the drawstring, he threaded the working end of the cord into the first foundation loop and knotted it after the manner of the netting known as *papai patia piti* (fig. 55, *b*; also fig. 53, *d-i*). A slight modification arose from the fact that the net was round, so that, instead of turning the work about and continuing the next row of mesh with the same cord, he cut short the working cord after each circle of mesh and started on the next row with a new strip of bark. When he had tied seven rows of mesh, each about 3½ inches deep, he threaded the end of the final working cord through the mesh of the last row and drew them together so as to close the bottom of the bag.

The *toto* was then ready to be filled with oranges, and its drawstring was pulled at the top to close its mouth.

Fringes

The fringes of *more,* which were once strung along under the eaves of houses for decoration, survive today in isolated places, and very frequently in an adapted form in the so-called grass skirts for dancing. Strips of finely shredded *more* are hung on a single or double cord, being fastened with any one of a number of different knots (fig. 56, *a, b, c*) and are oftentimes gathered together into a kind of heading of tied weaving or of tied, twined weaving (fig. 56, *d, e*) to a depth of several inches before being tied into several rows of ornamental mesh (Pl. XVI, *C*). This form of netting does not follow that of the fish nets and carrying nets, but consists simply in knotting together in pairs (fig. 56, *f, i*) the ribbons of the fringe, and in separating the pairs for each new row of mesh.

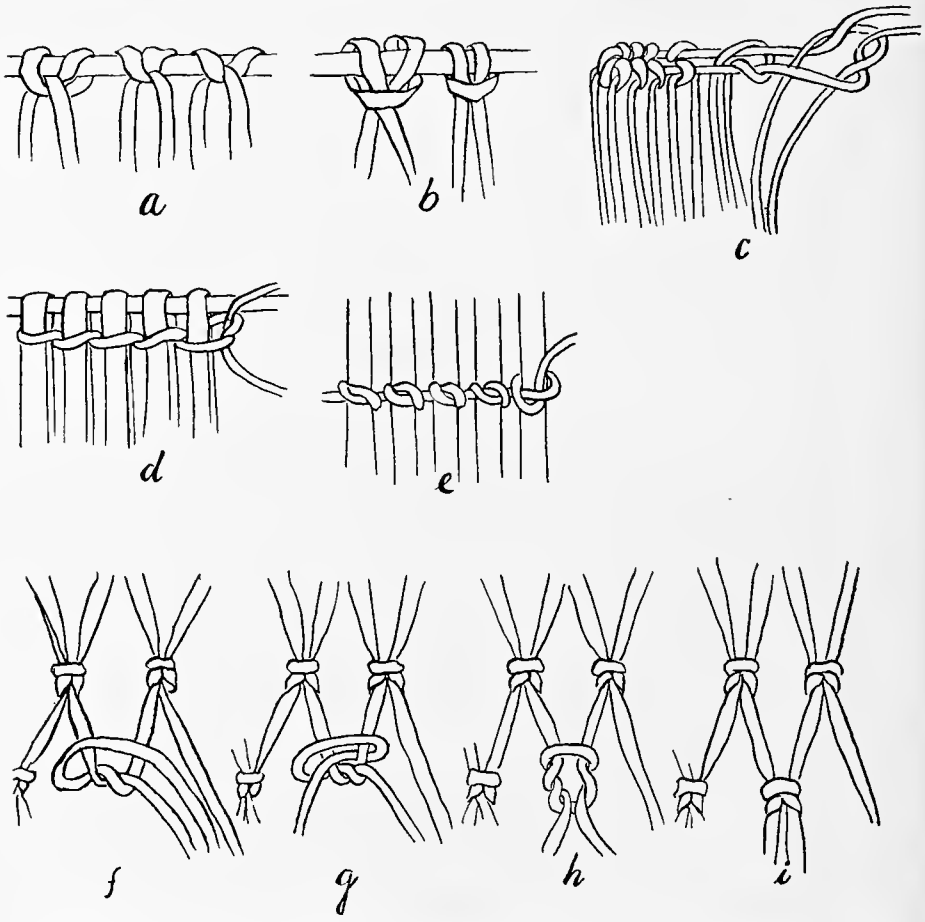


Figure 56.—Manners of tying fringes: *a, b, c,* slip knots designed to fasten fringes to a cord; *d,* tied twined weaving stroke making a heading on fringes; *e,* tied weaving stroke used for a heading on fringes; *f-i,* tying fringes into a netted mesh for a heading.

EXPLANATION OF PLATES

PLATE I.—AN OLD WOMAN OF MAUPITI MAKING A COCONUT LEAF BASKET OF TWILLED WORK.

PLATE II.—PREPARATION OF BAMBOO FOR PLAITWORK.

A. Bamboo sections opening in the shade.
B. Soaking and scraping the layers of bamboo.
C. The finished product.

PLATE III.—COCONUT LEAF BASKET FOR HEAVY LOADS.

A. *Haapee aua ha,* made of a whole coconut leaf.
B. *Haapee pahai,* made of a whole coconut leaf, the rib being split after completion of basket.
C. An *haapee* made of a half coconut leaf.
D. An *haapee* or *ufara,* made of a whole coconut leaf, tied in mesh form.

PLATE IV.—COCONUT LEAF COOKING BASKETS.

A. The *oini peho,* with corners.
B. An *oini* with handle.
C. An *oini* with ends closed by tying.
D. The *pute ia,* a sack for cooking fish.

PLATE V.—COCONUT LEAF CARRYING BASKETS.

A. An *oini* of four interwoven pairs of two-leaflet sections.
B. An *oini aua haro,* of four interlocked pairs of three-leaflet sections.
C. An *oini peho maha,* of four interlocked pairs of three-leaflet sections.
D. An *oini aua a piti,* of four interlocked pairs, each with two-leaflet and three-leaflet section.

PLATE VI.—COCONUT LEAF BASKETS OF TWILLED WORK.

A. The *ara iri* basket of vertical twilled-threes.
B. The *ara iri* basket of vertical twilled-twos.
C. The *ara iri* basket of horizontal twilled-twos.

PLATE VII.—IEIE ROOTLET BASKETS OF TWINED WORK.

A. The *haapua* shrimp basket.
B. The *hinai* shrimp trap.
C. Tobacco basket.
D. The *tavai* shrimp catcher.
E. Carrying satchel.
F. Sieve for catching shrimps.

PLATE VIII.—FISH BASKETS.

A. Container of split bamboo for keeping fish fresh.
B. Container of stems of the aanuhe fern for keeping fish.
C. Basket of stems of the aanuhe fern, for lobsters.

PLATE IX.—BAMBOO MATTING.

A. Roll of bamboo matting drying before use.
B. Matting used as walls of a house.

PLATE X.—COCONUT LEAF MATS.

A. Thatching mats drying before being put into place.
B. Form used for walls of house.
C. Form used for seats on ground.

PLATE XI.—FINE MATS.

A. Roughly, but accurately, made sample of lauhala matting, showing technique on wrong side.
B. A mat of more bark formerly used as skirt.

PLATE XII.—MODERN FANS AND HAT.

A. Diamond-shaped checkerwork fan of elements of different widths.
B. Triangular fan ornamented with fringe.
C. Man's hat of ornamental braids.

PLATE XIII.—HAT BRAIDS.

A. *Titona* braids: *a*, of three-ply checkerwork; *b*, of four-ply checkerwork; *c*, of five-ply checkerwork; *d*, of six-ply of different widths; *e*, of eleven-ply checkerwork; *f*, of twelve-ply combined checkerwork and vertical twilled-twos; *g*, of seven-ply vertical twilled-twos; *h*, of eight-ply combined vertical twilled-twos and twilled-threes; *i*, of nine-ply vertical twilled-threes.

B. *Manua* braids: *a*, *e rau*, pattern of vertical twilled-twos; *b*, *e fifi*, pattern of combined checkerwork and vertical twilled-twos; *c*, pattern of horizontal twilled fours; *d*, a pattern of horizontal twilled-fives; *e*, *ara iri*, pattern of horizontal twilled-fives; *f*, *Maramarama*, pattern of horizontal twills; *g*, *e taiara ua*, pattern of horizontal twills; *h*, *e fetia*, pattern of twilled work determined by the design; *i*, a recently invented design called "hearts" and "aeroplanes."

C. Ornamental edges: *a*, the *ope* edge of two working elements; *b*, the *ape* edge of four working elements; *c*, the *ape* edge of six working elements; *d*, the *tara*, edge, right side; *e*, the *tara*, edge, wrong side; *f*, the *puupuu*, edge of one working element, wrong side; *g*, the sharp-pointed *puupuu* edge on a braid of twilled-threes, wrong side; *h*, one form of blunt pointed *puupuu* edge of two working elements, wrong side; *i*, another form of blunt pointed *puupuu* edge of three working elements, wrong side.

PLATE XIV.—SANDAL MAKING.

A. Weaving sandal with one weft and two warp elements.
B. Weaving sandal on "loom" of two wefts and twelve warp elements.

PLATE XV.—TYPES OF SANDALS.

A. Rough Maupiti form.
B. Moorea form, outside and inside views.
C. Well-made Maupiti form, inside and outside views.

PLATE XVI.—CARRYING NET AND HOUSE FRINGE.

A. Process of manufacture of net.
B. Completed net filled with oranges.
C. Fringe for decorating eaves of house.

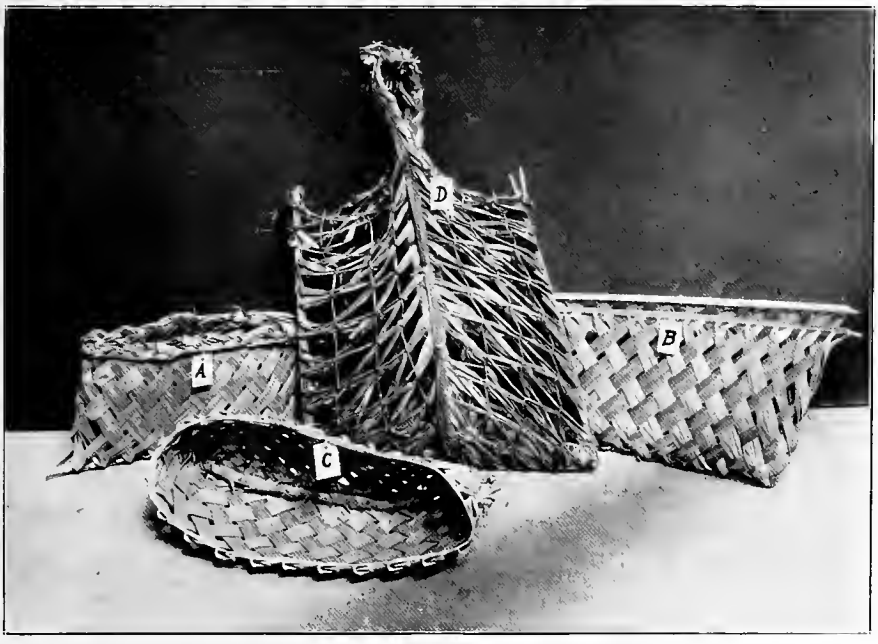
OLD WOMAN OF MAUPITI MAKING COCONUT LEAF BASKET OF TWILLED WORK

A

C

B

PREPARATION OF BAMBOO FOR PLAITWORK



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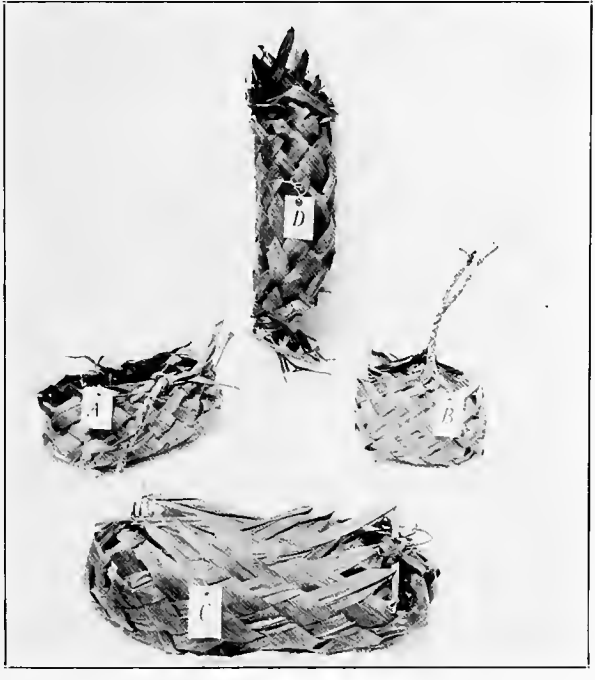
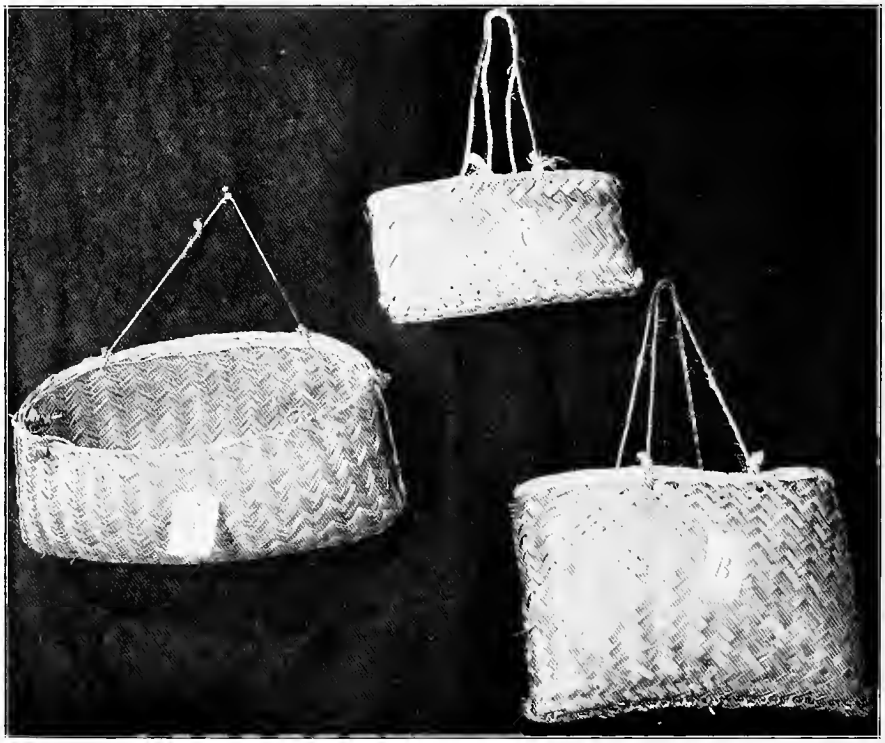


IV

COCONUT LEAF BASKETS

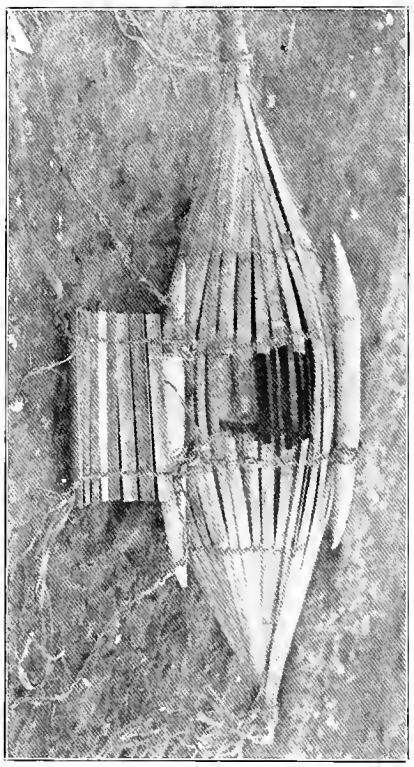
V



VI

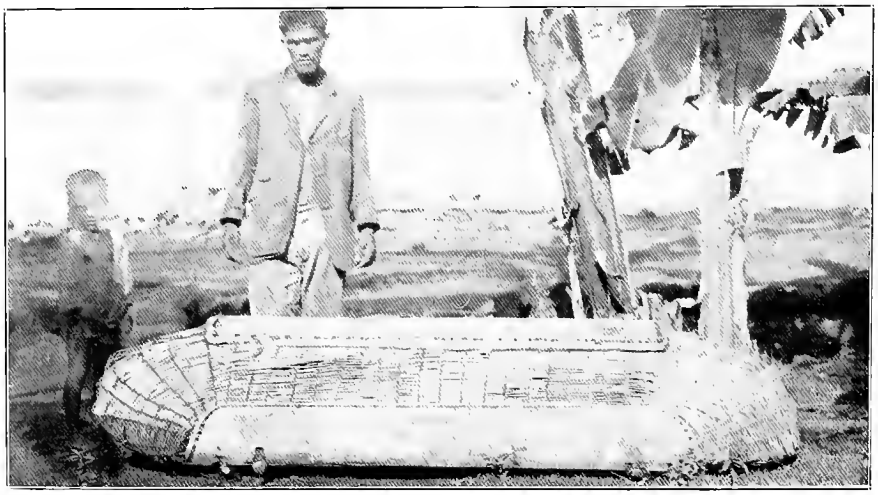
COCONUT LEAF BASKETS

IEIE ROOTLET BASKETS OF TWINED WORK



A

B



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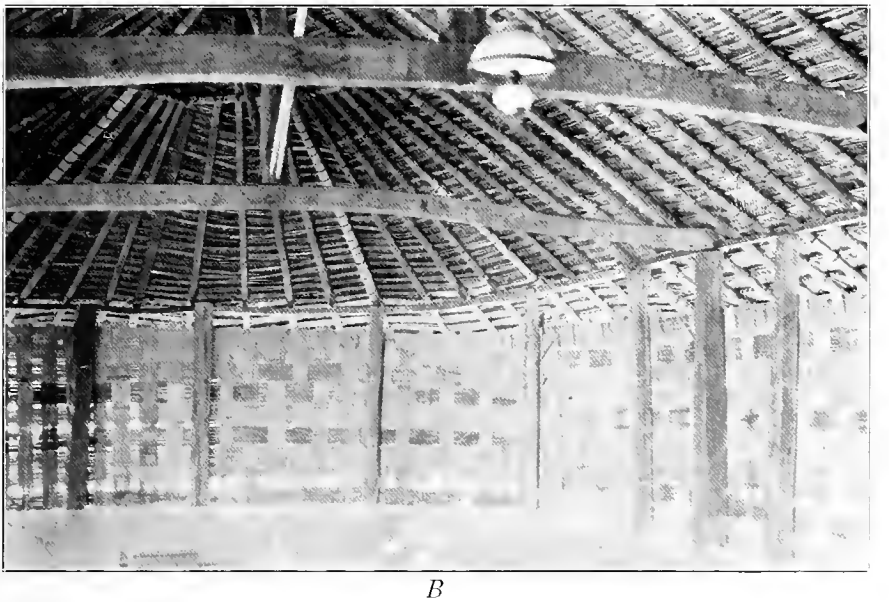
FISH BASKETS

A



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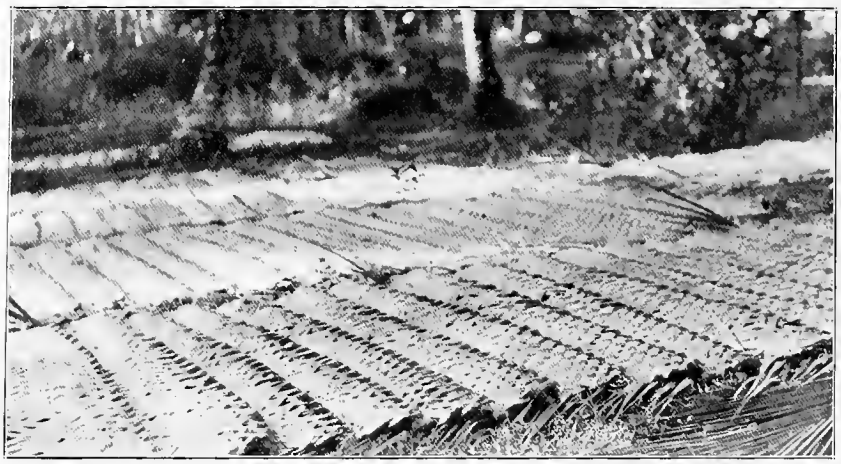
BAMBOO MATTING



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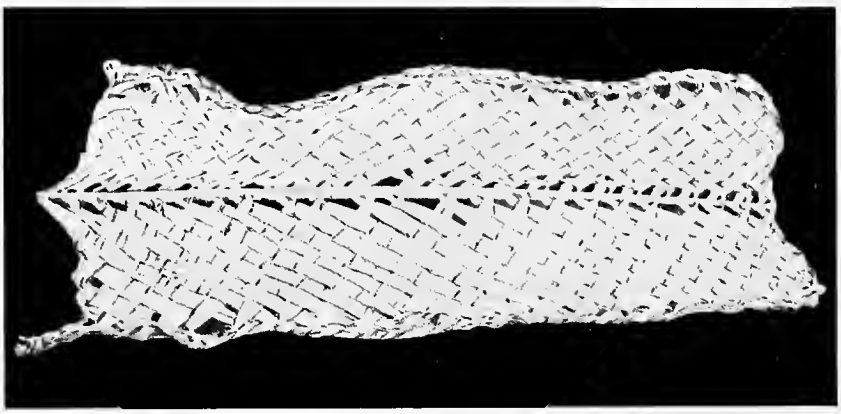

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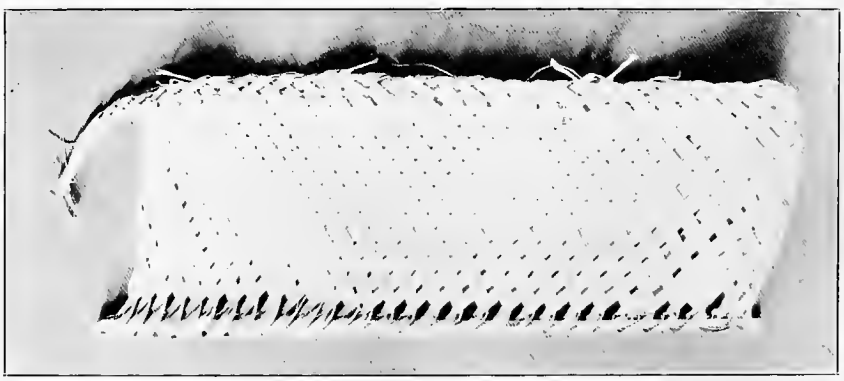

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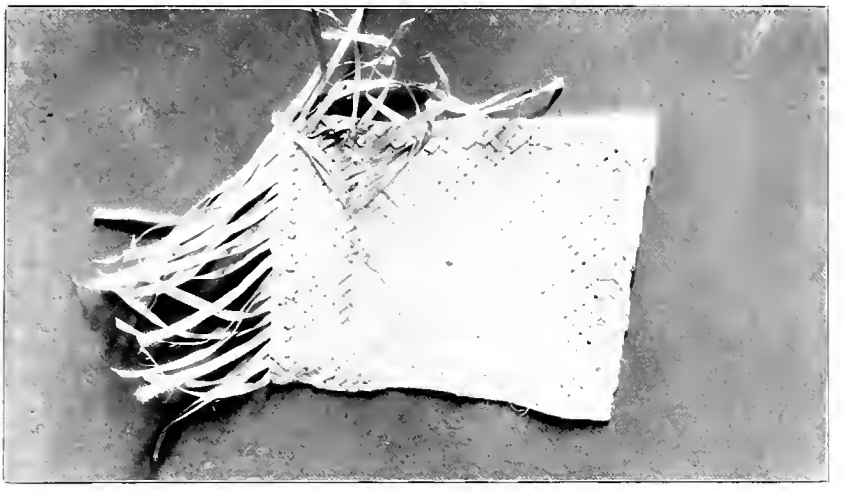
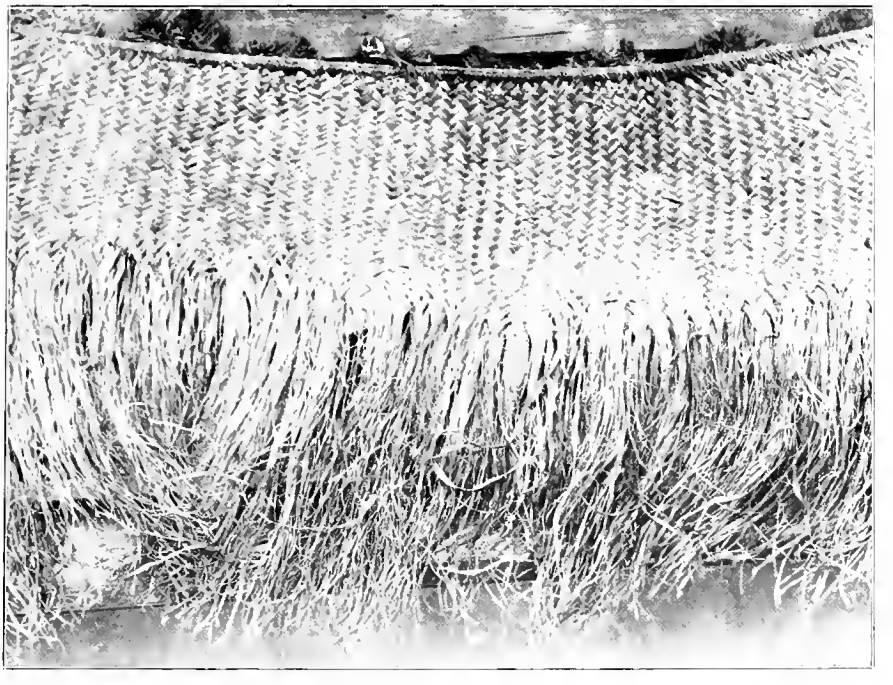
COCONUT LEAF MATS



A



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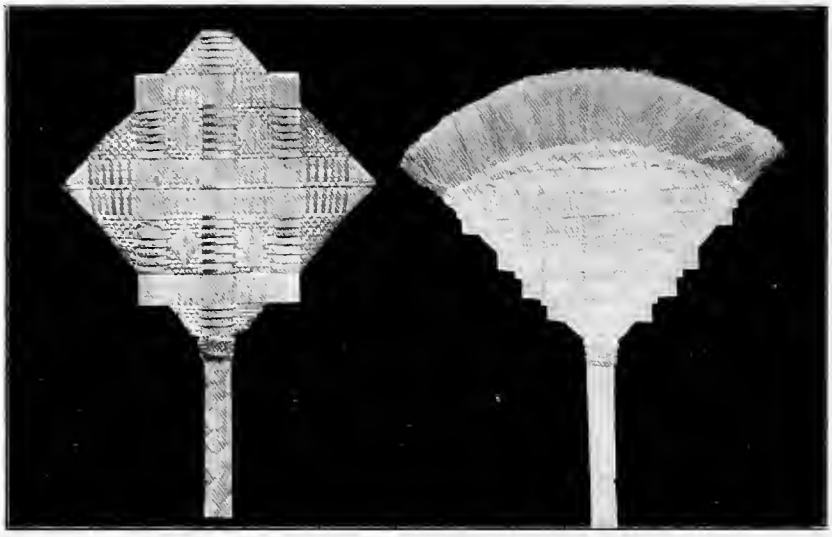
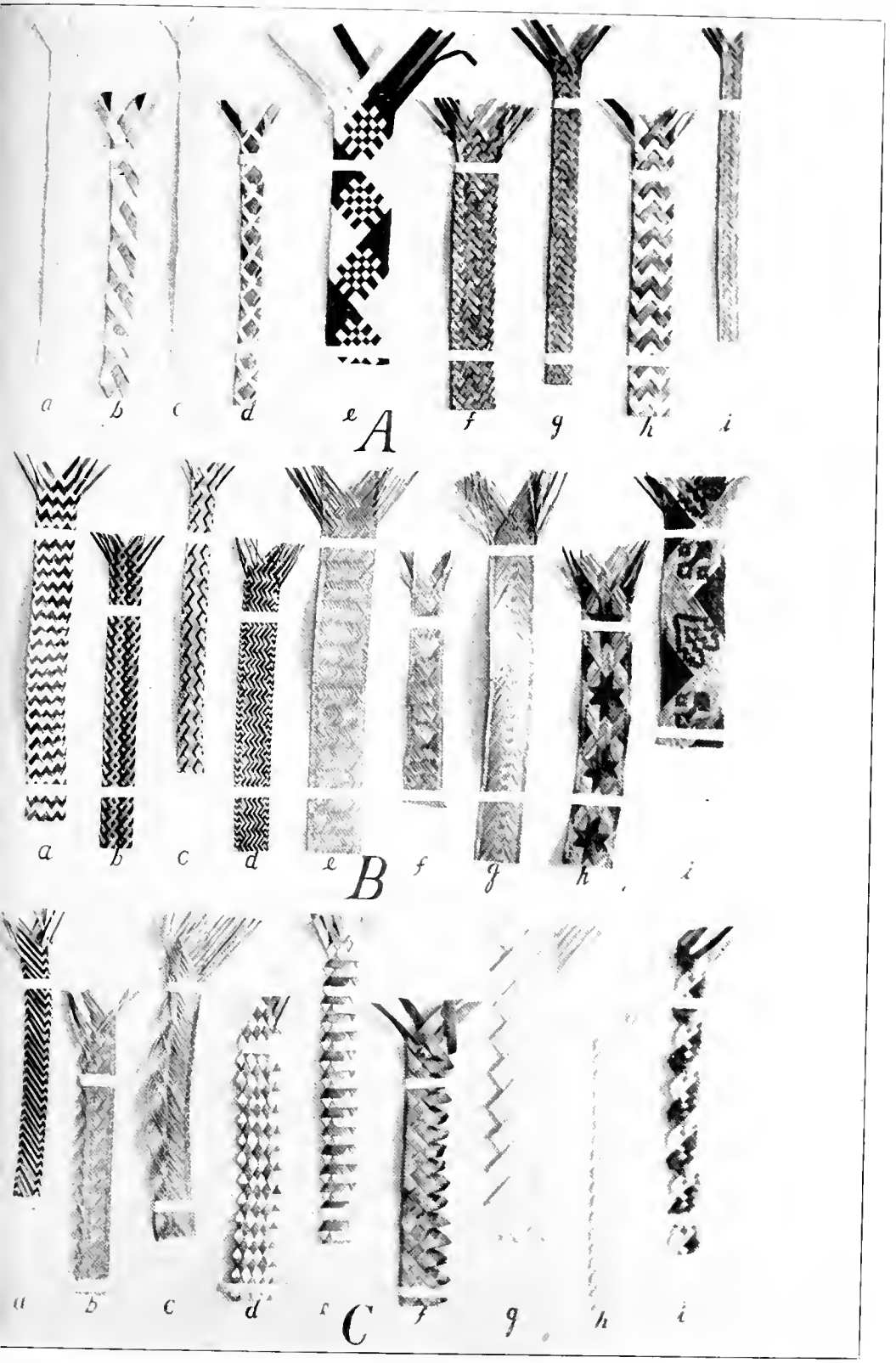
FINE MATS



A *B*

C

MODERN FANS AND HAT

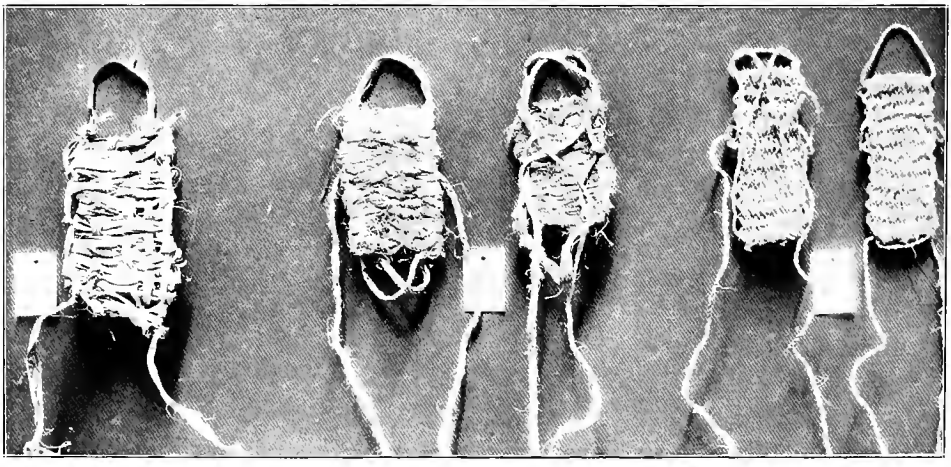


HAT BRAIDS

A

B

XIV



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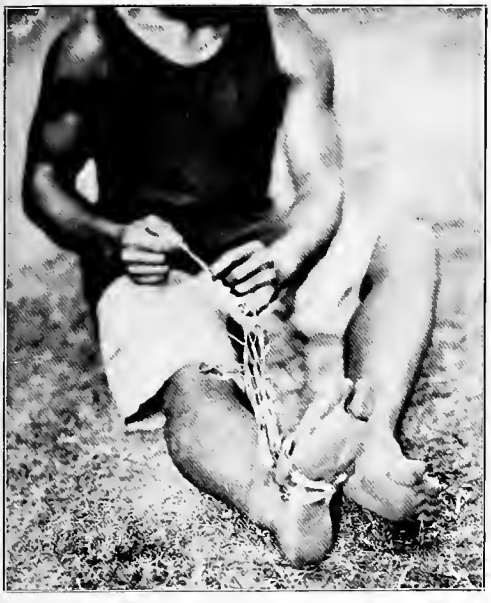
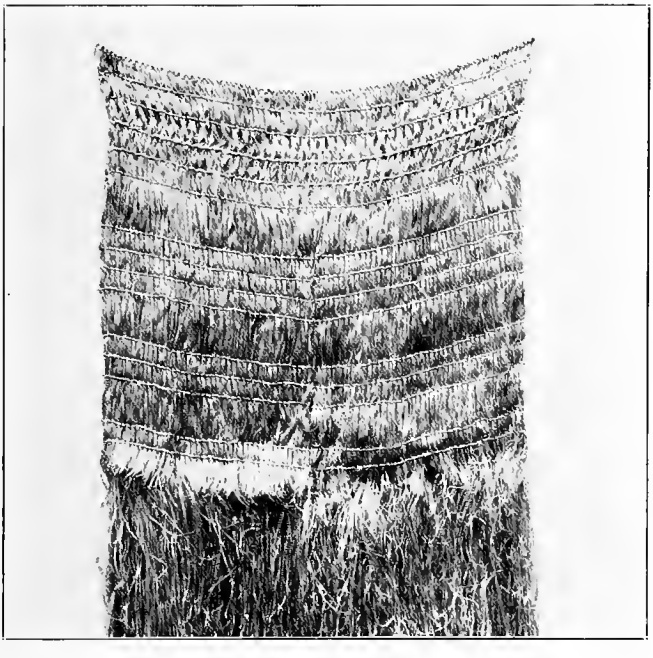
SANDALS



A

B



C

CARRYING NET AND HOUSE FRINGE

Date Due

Due	Returned	Due	Returned
OCT 13 1996			